

Research Utilisation & Knowledge Mobilisation: A Scoping Review of the Literature

**Report for the National Co-ordinating
Centre for NHS Service Delivery and
Organisation R&D (NCCSDO)**

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CONTENTS

No.	Chapter	Page
1.	Introduction	5
	1.1 Preamble – Why?	5
	1.2 Introducing the Study	6
	1.3 Structure of the Report	8
2.	Policy Background and Infrastructure	10
3.	Methods	20
	3.1 Phase I – Structured Search	20
	3.2 Phase II – Database Review	23
	3.3 Comparing Methods with Other Reviews	26
4.	Overview of the Findings	28
	4.1 Thumbnail Sketches	28
	4.2 Reprise of Methods	32
	PHASE 1 Management Literature	
5.	Nature of Knowledge & Knowing	38
	5.1 What is the Nature of Knowledge?	38
	5.2 How do We Know What We Know?	43
	5.3 What is Organisational Knowledge and Knowing?	45
	5.4 Why do These Questions Matter?	50
	5.5 Exemplar Papers	53
6.	Information Systems & Technology	56
	6.1 What Trends are Emerging?	56
	6.2 Linking with Other Domains	60
	6.3 Exemplar Papers	62
7.	Barriers to Transfer and Facilitators of Organisational Development	65
	7.1 Framework of Barriers	65
	7.2 Case Studies	69
	7.3 Lists of Barriers and Enablers	72
	7.4 Exemplar Papers	75
8.	Knowledge Transfer & Performance	77
	8.1 Theories and Models	77
	8.2 Measuring the Effectiveness of KM	83
	8.3 Exemplar Papers	86
9.	Organisational Learning	88
	9.1 Types of Knowledge from OL Perspective	88
	9.2 The Organisation	89
	9.3 The Groups	92
	9.4 Individuals	93
	9.5 Integrative Frameworks	95
	9.6 Exemplar Papers	99
10.	Organisational Form	102

10.1	Types of Knowledge	102
10.2	Types of Organisational Form	103
10.3	Boundary Factors	109
10.4	Exemplar Papers	111
11.	Resource Based View of the Firm	113
11.1	Themes Covered in the Literature	113
11.2	Exemplar Papers	115
12.	Communities of Practice	117
12.1	The Theory	117
12.2	Communities in Context	119
12.3	Knowledge Generated by Academics	121
12.4	Exemplar Papers	121
13.	Critical Theory	123
13.1	Critical Theory and Relationship with KM	123
13.2	Theoretical Implications	125
13.3	Exemplar Papers	127
14.	Anthropology, Culture & Conversation	129
14.1	Communication	129
14.2	Ethnographic Study	132
PHASE 1 Health Literature		
15.	Nature of Knowledge and Knowing	134
15.1	Evidence as Knowledge	134
15.2	Other Formulations of Knowledge	137
16.	Evidence Based Healthcare	139
16.1	Terminology	139
16.2	Evidence Based Medicine	139
16.3	Evidence Based Policy	141
16.4	Evidence Based Management	142
17.	Information Systems & Technology	143
17.1	Clinical Decision Support Systems and Systematic Reviews	143
17.2	Human Impact of IS/IT	145
18.	Barriers to Transfer and Facilitators of Organisational Development	147
18.1	Inventory of Barriers and Facilitators	147
18.2	Models at Organisational Level	148
19.	Knowledge Translation & Transfer	150
19.1	Translation	150
19.2	Transfer	151
20.	Organisational Learning	154
20.1	Models of Learning	154
20.2	Empirical Cases	155
21.	Organisational Form	157

22. Communities of Practice	158
22.1 The Academic-Practitioner Divide	158
23. Critical Theory	161
24. Anthropology, Culture & Conversation	164
25. Phase 2: Electronic Database Search	165
25.1 Volumes	165
25.2 Difference between Phases 1 & 2: Emphasis	167
25.3 Difference Between Phases 1 & 2: Themes	167
26. Conclusion	171
26.1 Overview	171
26.2 Comparing the Literature Streams	172
26.3 Thematic Domains, Discussion & Propositions	173
26.4 Final Observations	182
BIBLIOGRAPHY	184
Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain	215
Appendix 2 Glossary of Acronyms	226

1. Introduction

1.1 Preamble – Why?

Why would an NHS manager be interested in using evidence or research? What constitutes management evidence or knowledge? Where there is evidence, research or knowledge that has been generated by the academic community, does it get into practice, and if not why not?

The box below contains a vignette exchange between an academic and a manager published in the Health Service Journal, trade journal for health care managers in the UK. Prof Walshe exhorts NHS managers to use evidence and be research-aware, citing organisational reform as activities that can be informed by research. A manager responds by complaining that re-organisations are centrally mandated by government, regardless of local attitudes to the evidence base.

Box 1. Benefits of Evidence Based Management (Walshe, 2009)

..research can do more than contribute to better decisions – it can change the way we think about issues or problems and stimulate new and different ideas about services. In short, it is vital to our capacity for innovation.

Few NHS organisations these days would use a new drug or surgical technique without asking hard questions about the evidence, so why should they expect any less rigour when deciding how to reorganise their clinical directorates, reconfigure accident and emergency or introduce any organisational innovation?

I direct the National Institute for Health Research's programme on health services delivery and organisation, which spends around £11m a year on research intended to inform NHS managers and leaders in their decision making. We get some great research done, on everyday things which really matter to managers, like whether to move care out of hospital and into primary care; how to manage major acute service reconfigurations; or what happens when you link hospitals' payments to indicators of clinical quality.

"Kieran Walshe on evidence based decision making in the NHS"
Health Service Journal, 23rd April 2009

Evidence based management would be useful - but when the role is to implement policy based evidence decisions at Cabinet sound-bite level, would it make much difference?

A few days ago, my partner who is on our PBC Consortium Board came back from a Board meeting fuming: the management wanted the Consortium to become an Integrated Care organisation with Social Services - because this was Government Policy.

There are huge implications for Health, the PCT, practices in the Consortium - yes, and social services which are a county-wide, unfragmented service in integration: I ask you, is "because it is a government initiative" a good reason for anyone to accept enormous risks for their organisations (and the patients served by them) without a good business case - and some reason to believe that the next government (12 months away) will follow the same objectives?

Read the research (and please post the links) but please apply a healthy dose of cynicism to the design and conclusions.

Response posted by reader Mary Hawking

A not-so-recent example of government-driven health care reform and its relationship with evidence is the set of internal market reforms introduced to the UK in 1991, which was inspired by Professor Alain Enthoven, a US academic. He was invited to 'take a sympathetic look at the NHS' in 1984, and '[a]fter a quick tramp around the service' recommended that an 'internal market' be created to increase efficiency within the system. (Timmins, 1996, p458.). The reforms were introduced with remarkable speed in spite of, or perhaps because of, a lack of piloting or prior research. Kenneth Clarke, then Secretary of State for Health, in evidence to the House of Commons Select Committee, rebuffed the idea of formal monitoring and evaluation and suggested that to draw on academic advice was to display a degree of weakness (Social Services Committee, 1989).

Government policy has subsequently taken an evidence-based turn. The Labour government, elected in 1997, signalled a move away from ideology towards pragmatism with the philosophy of "what matters is what works" (Davies *et al*, 2000, p1). The modernising agenda supported use of research to support policy: "we need social scientists to help determine what works and why, and what types of policy initiatives are likely to be most effective" (Blunkett, 2000, cited in Davies *et al*, 2000, p13).

The Cooksey Review of publicly funded Healthcare Research, commissioned by the UK Treasury, found that research knowledge in the NHS had been under-utilised and, in the 'bench to bedside' spectrum, identified two gaps in translation. The first gap relates to 'translation of basic and clinical research into ideas and products'. The second gap in translation is about 'introducing those ideas and products into clinical practice' (HM Treasury, 2006, p99). Management evidence and research is located in the second translation gap. The watchwords in the pathway are 'research' and 'knowledge management', leading to healthcare delivery.

So, how does this preamble address our opening question of 'why be interested in evidence?' First, it would appear that there is research available that would be helpful to managers, sponsored by government funds. Second, there is a drive from the centre to get knowledge translated from bench to bedside, and this includes management knowledge. Third, it is generally regarded as a 'good thing' to do, and there is an appetite on the part of managers to be informed by evidence. Finally, the benefits of medical research were estimated recently (Health Economics Research Group *et al*, 2008) to be 39p in the pound forever for cardio vascular disease. It would be interesting to know whether management research would fare so well in an evaluation.

1.2 Introducing the Study

There is now a well established literature on the utilization of *clinical* evidence in health care; however, there has so far been less consideration of how management evidence and research might get into practice in health care organisations. This second literature stream redirects our attention from the clinical practitioner level to the organizational level. Over the last decade or so, there has been a rapid growth of the literature on knowledge management and mobilisation (we prefer to use the broader and less functionalist term 'mobilisation' in this paper) within the growing generic (i.e. non health care specific) management literature. What implications does it have for understanding and designing knowledge mobilisation processes in health care organizations?

1.2.1 The Brief

This study, commissioned by SDO, is a scoping review of the literature in the research utilisation (RU) and knowledge management (KM) fields. It goes on to consider implications for further research and NHS management practice.

The overall aim of this scoping review is to inform SDO's commissioning agenda and its own strategic thinking on how research-based (clinical and management) knowledge is accessed, applied and embedded (termed knowledge mobilisation). A draft was made available on 3rd July 2009 as briefing material to support the SDO Research Call "Research utilisation and knowledge mobilisation by healthcare managers (Ref: KM259)".

The aims of the study are:

- (i) using a structured review methodology, to review and synthesise the extant academic and practitioner grey literatures on organisational processes for knowledge mobilisation and knowledge management at the organisational or 'meso' level of analysis within the NHS and other health care systems;
- (ii) to assess the strengths, weaknesses and gaps of existing literature reviews and, subsequently, to search out primary sources to provide comprehensive mapping of the field.
- (iii) to identify existing theories and their gaps on mobilisation of research knowledge (acquisition, integration and application) on NHS managers;
- (iv) to extend the literature search to other sectors which may provide useful lessons for health care (e.g. other professionalised settings such as law and management consulting);
- (v) finally, to make recommendations to SDO on how to develop knowledge mobilisation developmental activities within the NHS field.

1.2.2 Objectives

We have addressed the brief by comparing generic and health sector literature streams, using propositions as a tool to highlight gaps and identify areas for further work. The objectives of this report are:

- (i) using a structured review methodology, to review, map and synthesise two extant literatures - the health care literature (academic and practitioner, including grey literature) and the generic management literature - on research utilisation and knowledge mobilisation;
- (ii) to compare and contrast the two bodies of literature, exploring which management sub-literatures have crossed into the health care literature stream and which not;
- (ii) to explore gaps in the health care literature on research utilisation and the further possible utility of the generic management literature for health care organisations;
- (iii) to develop propositions to inform a research agenda for the future.

1.2.3 Defining Terms

The terminology in this field is not settled. We could not therefore restrict our focus to a single term such as 'knowledge mobilisation' or 'knowledge management'. 'Research utilisation' (RU) and 'evidence based management' (EBMgt) are equally relevant to the scope of the review, and likewise the concept of knowledge 'translation'. Loose definition of terms informed our search strategy, which needed to be broad rather than narrow to capture the panoply of language.

We are concerned with the 'meso' or intermediate level, located between large-scale macro forces such as the economic and policy environment and the micro level of individual and group interactions. We define 'meso' to be the organisational level within the NHS.

1.2.4 Research, Evidence and Knowledge

It is common to view research, evidence and knowledge as components in a hierarchical relationship. "Research is often seen as one form of evidence, and evidence as one source of knowledge" (Nutley *et al*, 2007, p23). It is also possible to see them as varying levels of abstraction and interpretation. Research is an active process that produces findings. It is the only one of the three terms that is both a verb and a noun. Evidence may be viewed as a consequence of judging the merit of the findings, especially empirical results (Culyer and Lomas, 2006). Knowledge is the broadest of the three terms which allows for empirical, theoretical and experiential ways of knowing (Breachin and Siddell, 2000). Experiential knowing may be affective, cognitive or behavioural, giving recourse to feelings and intuition which are entirely subjective. Evidence is generally used as an objective form that is independent of subjective experience.

The distinction between the three terms is not problematic for our review. The difficulty in separating them simply means that we need to ensure that the review is broad enough to capture each. 'Learning', 'information', 'knowing', 'understanding', 'cognition', 'epistemology' and words with similar resonance also qualify for inclusion within the review.

1.3 Structure of the Report

Chapters 1 – 4 provide contextual information: introduction to the study, policy background, methods; and an overview of the findings.

Chapters 5 – 14 cover the first phase of the structured search involving management journals. There is one section per domain that has emerged from the literature. Domains or thematic categories identified during the review are:

- Nature of Knowledge and Knowing
- Information Systems & Information Technology
- Barriers to Transfer and Facilitators of Organisational Development
- Knowledge Transfer, Translation & Performance
- Organisational Learning
- Organisational Form
- Resource Based View of the Firm
- Communities of Practice
- Critical Theory

- Anthropology, Culture & Conversation Management

Chapters 15 – 24 cover the first phase of the structured search of health and social science journals with one section per domain, mapped from the management themes above. The additional domain to be considered is:

- Evidence Based Movement

Chapter 25 describes the second phase of the review involving an electronic data base search that was conducted on a systematic basis. This produced a further domain for consideration:

- Super Structures

Chapter 26 contains the Conclusion along with twelve propositions that highlight areas for further research.

2. Policy Background & Infrastructure

The policy context has been set by several recent reports. The Cooksey Report on UK health research funding (HM Treasury, 2006) identified two gaps in translation of health research: from bench to products and from products to bedside. Getting research into practice, from products to bedside, concerns health service managers and professionals. The Report of the High Level Group on Clinical Effectiveness (Department of Health, 2007) recommended a programme of action to enhance effectiveness and efficiency of clinical care, with clinicians and managers working in partnership. CERAG, (the Clinical Effectiveness Research Agenda Group, 2008) has set out a research agenda around knowledge, research implementation and evidence.

This chapter outlines a chronology of policy development that has led to creation of a complex infrastructure. The reported dates relate to specific triggers, including implementation dates, announcements of intention through policy publications and calls for competitive bids.

1948 – 1991: Curiosity-Driven Research

Health service research has grown from biomedical roots. "Innovation in medical research has been driven largely by the intrinsic interest of diseases processes to clinicians and scientists, and medical practice has been shaped by the intellectual challenge of clinical problems" (Peckham, 1991, p367). R&D infrastructure was built around medical research, involving medical schools (Department of Education and Science), teaching hospitals (Department of Health), Medical Research Council (MRC) charities, industry, the NHS and other disparate bodies.

Prior to 1991, Special Health Authorities were tertiary clinical centres that promoted research, clinical care and education through their alliance with an Institute. The National Hospital for Neurology and Neurosurgery, for example, was twinned with the Institute of Neurology in Queen's Square, allowing clinicians to pursue an academic career and structure a research programme around their patient base (or, tacitly, structure a patient base around their research interests).

The balance between research needs and NHS patient care across the UK was not widely understood, but introduction of the internal market from 1991 onwards stimulated a need for greater clarity. Purchasers were given the role of commissioning patient care from hospitals or providers, and their remit was to fund NHS care, not research. At the same time, the fruits of R&D (such as pharmacological and radiological break-throughs) placed a financial burden on the NHS which struggled to manage the gap between the affordable and the technically possible. The service perception was that pursuit of R&D "leads to unplanned service pressures arising from research-driven developments" (Peckham, 1991, p368). Among researchers there were anxieties that R&D would wither under the internal market regime.

1990s: Rise of Evidence Based Medicine

The evidence based movement was stimulated in the 1970s (Cochrane, 1972), but gained momentum in the 1990s (Niessen *et al*, 2000; Coleman & Nicholl, 2001). The explicit methodologies used to determine "best evidence" in "evidence-based medicine" were led by Sackett & Rosenberg (1995) and Guyatt *et al* (1992).

1991: R&D Strategy

Security of funding and co-ordination of R&D in the health service was enhanced by the announcement of an R&D strategy in 1991 to be led by Professor Michael Peckham. "The NHS and medical research have been on parallel tracks" he argued (Peckham, 1991, p368). The House of Lords Select Committee on Science and Technology (1988) had stated that "[t]he NHS should be brought into the mainstream of medical research. It should articulate its needs; it should assist in meeting those needs; and it should ensure that the fruits of research are systematically transferred into service." At the same time, wider questions of content and delivery of health care had no mechanism for being addressed through systematic research.

An infrastructure was created in which the 14 regional health authorities had responsibility for planning and prioritising R&D, linking up to central co-ordination and funding. A national expenditure target of 1.5% of the NHS budget was identified for R&D. The scope of the programme was: (a) orientation towards applied research, taking account of advances in basic research; (b) setting of priorities based on disease burdens and public health targets; (c) encouragement to abandon ineffective methods and poor quality research in favour of beneficial practices; (d) an evaluative approach (anticipating NICE); (e) improved dissemination; and (f) a workforce skills and training review in the area of epidemiology, health services research, health economics and other relevant disciplines. The strategy was hailed as 'perhaps the first comprehensive attempt to develop a national R&D infrastructure for health care' (Peckham, 1991, p371) and set the scene for all subsequent developments.

1997: R&D Budget

A number of separate funding streams were brought together to form the NHS R&D budget in 1997, and national programmes were established to address different aspects of health care:

- Health Technology Assessment (HTA), which was set up in 1993
- Service Delivery and Organisation (SDO), which was set up in 1999
- New and Emerging Applications of Technology (NEAT)
- research synthesis work, including the Centre for Reviews and Dissemination in York and the Cochrane Collaboration
- Research Capacity Development

1999: Special Health Authorities

Special health authorities were set up to provide a national service to the NHS or the public, under section 11 of the National Health Service Act 1977, but have changed their form and content over time. There are currently 10 special health authorities which function formally as arms length bodies to the executive¹. Two have particular relevance to R&D policy and structure:

- The **National Institute for Clinical Excellence (NICE)** was set up in 1999 and, on 1 April 2005 joined with the Health Development Agency to become the new National Institute for Health and Clinical Excellence (still abbreviated as NICE). It publishes clinical appraisals of treatments, based

¹ Information Centre for Health and Social Care; National Institute for Health and Clinical Excellence; National Patient Safety Association; National Treatment Agency for Substance Misuse; NHS Appointments Commission; NHS Blood and Transplant; NHS Business Services Authority; NHS Institute for Innovation and Improvement; NHS Litigation Authority; NHS Professionals Special Health Authority.

primarily on cost-effectiveness, and makes recommendations on their uptake within the NHS.

- The **NHS Institute for Innovation and Improvement** (NHS Institute) supports adoption and dissemination of new ways of working and new technology. In its 2008/2009 work plan² its work programme has been outlined as: safer care, delivering quality and value, commissioning for health improvement, iLinks, building capability for a self-improving NHS, exploiting innovation - National Innovation Centre. The NHS Institute publishes papers on its research. These are not freely available to the public.

2000: 'Research and Development for a First Class Service'

Changes to the Department of Health's funding policy were announced in the paper 'Research and Development for a First Class Service' (Department of Health, 2000) for implementation from April 2001 onwards. Two funding streams were introduced: NHS Support for Science, and NHS Priorities and Needs R&D Funding. The aim was consistent with the 1991 strategy in trying to target NHS money on the R&D priorities and needs of the NHS, initially in the key areas of cancer, heart disease and mental health. It also promoted collaboration and networks between researchers and the organisations involved with R&D in the NHS.

2001: Cancer Research Network

The NCRN was established by the Department of Health in April 2001 "to provide the NHS with an infrastructure to support prospective trials of cancer treatments and other well-designed studies and to integrate and support research undertaken by cancer charities"³. There are now 33 cancer networks.

2004: Science and Innovation Investment Framework 2004–2014

The Treasury published a ten year investment framework for science and innovation (summarised in the box below). It demonstrates a commitment to knowledge transfer and aims for the UK to be second only to the USA in international rankings of R&D excellence.

Box 2. Extracts from Science and Innovation Investment Framework 2004-14 Source: HM Treasury *et al* (2004)

<p>Ambitions for UK science and innovation World class research at the UK's strongest centres of excellence:</p> <ul style="list-style-type: none">• Maintain overall ranking as second to the USA on research excellence, and current lead against the rest of the OECD; close gap with leading two nations where current UK performance is third or lower; and maintain UK lead in productivity• Retain and build sufficient world class centres of research excellence, departments as well as broadly based leading universities, to support growth in its share of internationally mobile R&D investment and highly skilled people <p>Greater responsiveness of the publicly-funded research base to the needs of the economy and public services:</p> <ul style="list-style-type: none">• Research Councils' programmes to be more strongly influenced by and delivered in partnership with end users of research• Continue to improve UK performance in knowledge transfer and commercialisation from universities and public labs towards world leading benchmarks
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² NHS Institute Business Plan 2008/09

³ <http://ncrndev.org.uk>

Increased business investment in R&D, and increased business engagement in drawing on the UK science base for ideas and talent:

- Increase business investment in R&D as a share of GDP from 1¼ per cent towards goal of 1.7 per cent over the decade
- Narrow the gap in business R&D intensity and business innovation performance between the UK and leading EU and US performance in each sector, reflecting the size distribution of companies in the UK

Confidence and increased awareness across UK society in scientific research and its innovative applications:

- Demonstrate improvement against a variety of measures, such as trends in public attitudes, public confidence, media coverage, and acknowledgement and responsiveness to public concerns by policy-makers and scientists

2005: UK Clinical Research Networks

The UK Clinical Research Network (UKCRN) was established in February 2005, with funding from the Department of Health, to support clinical research and to facilitate the conduct of randomised controlled trials and other well-designed studies across the UK. It built on the model of the Cancer Networks.

2006: Best Research for Best Health (BRfBH), Department of Health

BRfBH created a new entity, the National Institute for Health Research (NIHR), which has become the organisation responsible for the management of all Department of Health research. HTA, SDO and UKCRN programmes were brought under its aegis. The scope and structure of NIHR, as set out in its website⁴, is presented below.

Figure 1. NIHR Scope and Structure



⁴ http://www.nihr.ac.uk/about/Pages/about_information.aspx

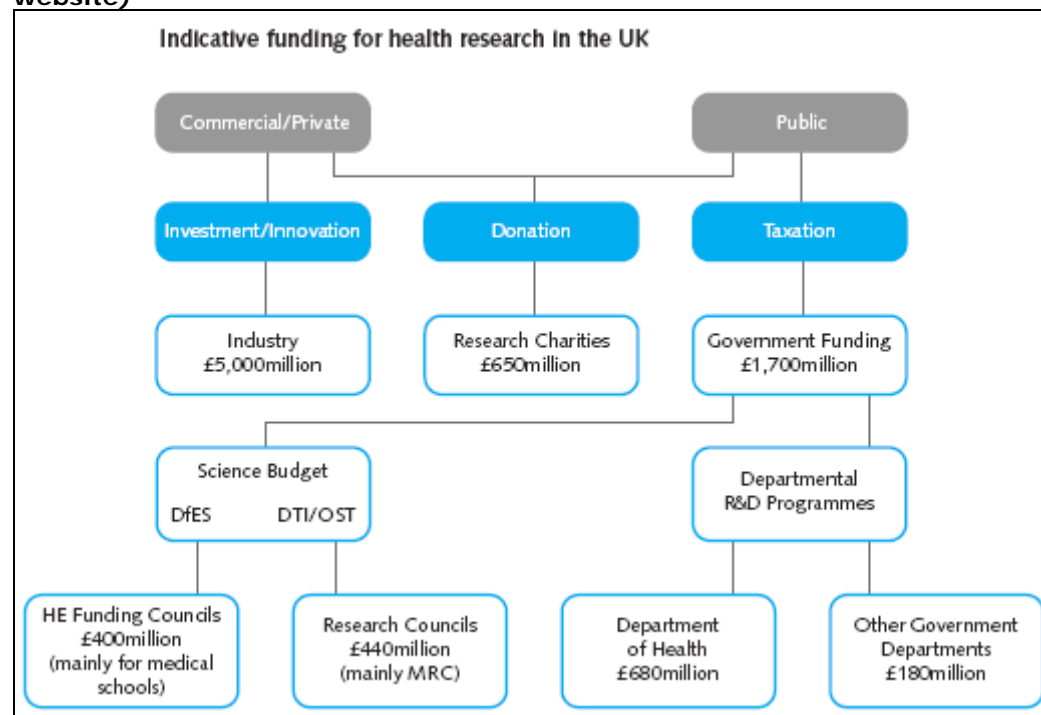
According to BRfBH (Department of Health, 2006, p11), the establishment of a National Institute for Health Research completes the trio of institutes to form a framework of innovation, evaluation and implementation:

- National Institute for Health Research (NIHR) – to identify innovative ways of preventing, diagnosing and treating disease;
- National Institute for Health and Clinical Excellence (NICE) – to evaluate these innovations to assess their clinical and cost effectiveness;
- NHS Institute for Innovation and Improvement (NII) – to ensure that agreed innovations are implemented in the NHS.

In England, the National Cancer Research Network had been established to remove the barriers within the NHS for clinical research. NIHR commissioned further networks for England in mental health, diabetes, medicines for children, stroke, and dementias and neurodegenerative diseases under the UK Clinical Research Network (UKCRN) Coordinating Centre.

Funding of health research in the UK was scoped out below (Department of Health, 2006,, p37) at £7,350 million (which out of a GDP of £1,209,334 million⁵ represents 0.61% of GDP).

Figure 2. Indicative Funding for Health Research in the UK (Source: NIHR website)



2006: Biomedical Research Centres

Institutions were invited by NIHR to apply to become Biomedical Research Centres (BRCs) in 2006. The aims were to drive innovation in the prevention, diagnosis and treatment of ill-health; translate advances in biomedical research into benefits for patients; and contribute to international competitiveness by driving excellence. BRCs needed to demonstrate existing research excellence;

⁵ Source: gross domestic product (GDP) 2005 as estimated by the International Monetary Fund and published on Wikipedia

critical mass and partnership with industry. The NIHR created twelve Biomedical Research Centres, five defined as 'Comprehensive' and seven as 'Specialist'.

"Comprehensive" Biomedical Research Centres

NHS Organisation	Academic Partner
Cambridge University Hospitals NHS Foundation Trust	University of Cambridge
Guy's & St Thomas' NHS Foundation Trust	King's College London
Imperial College Healthcare NHS Trust	Imperial College London
Oxford Radcliffe Hospitals NHS Trust	University of Oxford
University College London Hospitals NHS Foundation Trust	University College London

"Specialist" Biomedical Research Centres

NHS Organisation	Academic Partner	Specialism
Great Ormond Street Hospital for Children NHS Trust	UCL Institute of Child Health	Paediatric/Child Health
Central Manchester & Manchester Children's University Hospitals NHS Trust	University of Manchester	Genetics and Developmental Medicine
Moorfields Eye Hospital NHS Foundation Trust	UCL Institute of Ophthalmology	Ophthalmology
Newcastle upon Tyne Hospitals NHS Trust	Newcastle University	Ageing
Royal Liverpool & Broadgreen University Hospitals NHS Trust	University of Liverpool	Microbial Diseases
Royal Marsden NHS Foundation Trust	Institute of Cancer Research	Cancer
South London and Maudsley NHS Trust	KCL Institute of Psychiatry	Mental Health

2006: Cooksey - "A review of UK health research funding"

Sir David Cooksey was commissioned by HM Treasury to undertake an independent review to advise on design and institutional arrangements for the public funding of health research in the UK. In analysing the UK research system, Cooksey identified barriers to translation of research into practice:

- **the 'Haldane Principle'**, derived from a report of 1918 into the structure of Government⁶, and interpreted as a rallying cry to maintain an arms length relationship between scientists and government;
- **The Rothschild Report** "*A framework for Government Research and Development*" (1971)⁷ re-evaluated the 'Haldane Principle' towards formation of a customer-contractor relationship in research funding. However, it never really got off the ground;
- **'Curiosity-driven' research** is the dominant mode, as inferred by Peckham earlier (1991);
- **Incentives put in place by scientific publications and the Research Assessment Exercise:** basic research is given greater prestige over and above application, inhibiting researchers from developing the findings of the curiosity-driven science;

⁶ *Report of the Machinery of Government Committee*, Ministry of Reconstruction, Cmd 9230, 1918 (The 'Haldane Report')

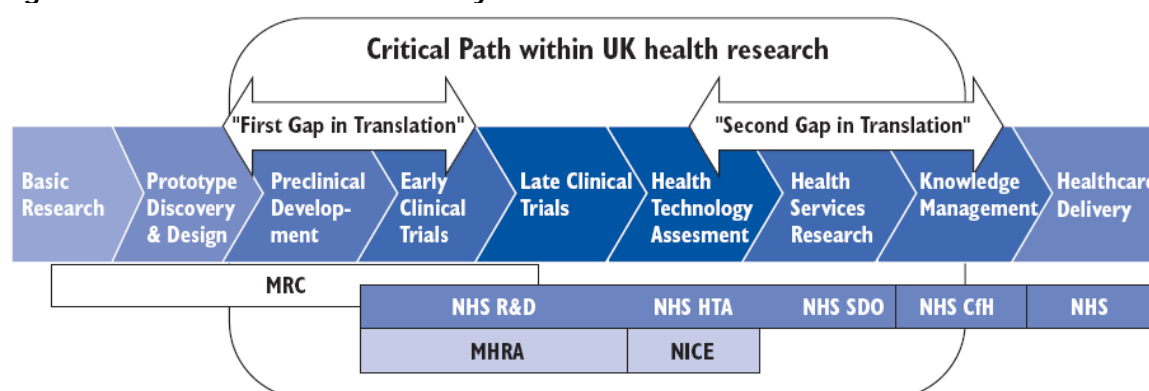
⁷ *The Rothschild Report: A Framework for Government Research & Development*. (Cmnd 5046) London: HMSO, 1971

- **The influence of peer review** is effective in identifying high quality basic research projects, but is not helpful in promoting translational and applied health research programmes. “Translational or clinical research tend to benefit from a more iterative approach” (p37);
- **Career choices:** “clinical research has had a tendency to be underpowered scientifically and uninstructed by many of the advances in modern biology” (p38). Clinical research is not an attractive career option for most medical doctors;
- **Institutional and financial barriers.** Separation of the basic research supported by the MRC from the “NHS research community of practice-oriented research” (p 38) supported by DH was considered to be a powerful institutional barrier. Cooksey declared that the Joint MRC/NHS Health Research Delivery Group had not been successful. He also identified weaknesses in the UK’s arrangements for funding, supporting and regulating clinical trials.

Bench to Bedside. Cooksey presented a schematic pathway within UK health research in which he identified two gaps in translation. The first was from basic research into treatment developments. The second gap arose in translating new medical interventions into everyday practice. “In this context, Knowledge Management, from research observation to routine clinical practice, can be broken down into four discrete activities: Knowledge Production, Knowledge Transfer, Knowledge Reception and Knowledge Use.” (p99). The whole pathway reflected the journey of science from bench to bedside.

Cooksey (HM Treasury, 2006, p22) noted that: “[t]he NIHR, together with the National Institute for Health and Clinical Excellence (NICE) and the National Institute for Innovation and Improvement, will play a key role in the NHS knowledge management system.”

Figure 3. Bench to Bedside Pathway



Source: Cooksey page 99 “Blue boxes - parts of pathway correspond to specific responsibilities of public sector bodies supporting research. MRC: Medical Research Council. NHS R&D: National Health Service Research and Development. NHS HTA: NHS Health Technology Assessment programme. NHS SDO: Service and Delivery Organisation research programme. NHS CfH: Connecting for Health. Light blue boxes - parts of pathway correspond to the specific responsibilities of statutory regulatory agencies. MHRA: Medicines and Healthcare products Regulatory Agency. NICE: National Institute for Health and Clinical Excellence.”

Ultimately Cooksey recommended that Office for Strategic Coordination of Health Research (OSCHR) should be formed to merge the health research budgets of the MRC and DH, whilst retaining two separate organisations.

2007: The Report of the High Level Group on Clinical Effectiveness established by the Chief Medical Officer (Department of Health 2007)

The Group was asked to review areas of significant variations in use of evidence and to recommend a programme of action to enhance the effectiveness and efficiency of clinical care. The Group “identified no “single bullet” to address the issue of clinical effectiveness. Instead, systematic, context-specific initiatives are needed, requiring local clinical engagement. Evidence-based medicine should be complemented by evidence-based implementation, demanding attention to education programmes from undergraduate studies onwards” (p5). Better links between NHS and education formed a primary theme.

2008: CLAHRC

NIHR created nine National Institute for Health Research Collaborations for Leadership in Applied Health Research and Care (CLAHRCs) to begin in October 2008 with £88m funding for five years. The 9 were selected through competitive process from 22 bids (SDO, 2008). Their purpose is to: “develop an innovative model for conducting applied health research and translating research findings into improved outcomes for patients based on mutually beneficial partnerships between universities and NHS organisations.”

The concept of CLAHRCs was predicated on evidence that interaction between researchers and practitioners bridged the translation gap:

“...a major predictor for the application of research to practice is the extent of interaction throughout the research process between the researchers and the practitioners who could potentially use the results” (Denis and Lomas 2003: S2:2; quoted in SDO, 2008)

Each CLAHRC has specified detailed interventions that are to be examined, e.g. in the field of mental health. The NIHR SDO has initiated an evaluation of the CLAHRCs.

2009: Academic Health Science Centres

An academic health science centre (AHSC) is a partnership between a healthcare provider and a university, intended to be distributed models that link scientist and patient across a geographical area.

In 2007 NIHR opened a competition to create Academic Health Science Centres as a means of addressing Cooksey’s gaps in translation from bench to bedside. The Centres were also one of the key recommendations of the High Level Group on Clinical Effectiveness: “to harness better the capacity of higher education to assist with improving the effectiveness of clinical care through promoting the development of new models of community wide ‘academic health centres’ to encourage relevant research, engagement and population focus and embed a critical culture that is more receptive to change” (Department of Health, 2007, p6).

Imperial College Healthcare NHS Trust was the first AHSC, created on 1 October 2007 (and given official government recognition on 9th March 2009) by merging Hammersmith Hospitals NHS Trust and St Mary’s NHS Trust. The five AHSCs are: Cambridge University Health Partners, Imperial College, King’s Health Partners, Manchester AHSC and UCL Partners.

The box below sets out the vision of AHSC as articulated by Steve Smith, Chief Executive of the Imperial College AHSC. It is reproduced in full as it contains many themes that play into our wider literature review.

Box 3. Case Study (Source: McLellan, 2009)

Imperial College Healthcare pioneers shift in managerial relations

Imperial College Healthcare trust chief executive Steve Smith tells Alastair McLellan how the new academic health science centre allowed a radical cultural shift to clinical leadership

"If you wanted to create a system that was best designed to prevent improvements in patient outcomes, you'd create the system we have in this country." So says Steve Smith, chief executive of Imperial College Healthcare trust, England's largest hospital trust and the organisation that has provided much of the impetus behind establishing academic health science centres. It has also pioneered a generational shift in the power relations between managers and clinicians.

Professor Smith lays out in stark terms the problem that needed to be resolved. "It had been clear for about 25 years that the structure in the UK wasn't working. The academic [health science] sector was delivering in terms of discoveries, [but] the service side was not delivering in terms of outcomes. "Service people were only interested in targets and financial difficulties. Universities wanted nothing to do with improving outcomes. It was a dialogue of the dead."

The result was an NHS that was slow to change and innovate. The health sciences community in west London initially pinned its hopes on developing the Paddington health campus. When the project failed, senior clinical academics at Imperial College London - including now health minister Lord Darzi as well as Professor Smith - began to explore alternatives.

The question they asked themselves was: "Could we kick-start the mechanism of NHS management with the aspirations of a globally competitive university?" They settled on the AHSC model - a coming together of leading hospitals and the clinical departments of prestigious universities. The best known example is Johns Hopkins University in Baltimore, USA. But Imperial's research found European countries, particularly the Dutch, had taken the idea even further.

Driven by the "complete mayhem" of having to deal with two competing NHS institutions, Imperial championed the merger of Hammersmith Hospitals trust and St Mary's trust. Attention then turned to establishing the AHSC. The trust and university had to remain separate legal entities since no academic institution would take on the liabilities of a major hospital. Therefore, Imperial adopted the Hopkins model where authority is delegated to a joint chief executive.

Defining moment

"I had to persuade 850 consultants this was a good idea," says Professor Smith. It was at this point that Imperial took a gamble that could become a defining moment in the management of the NHS. Clinicians were given the opportunity to take charge of the new trust in "a complete revision of the managerial/clinician relationship".

Seven clinical programme groups were created, with annual budgets ranging from £40m-£108m. The group director posts were open to all, but crucially candidates were required to demonstrate they had the confidence of clinical colleagues. Every clinical programme group director chosen was and is a doctor.

The director is supported by a head of operations, just as at specialty level the clinical chiefs of service work with a senior general manager. Each group also has a faculty of medicine lead, plus individual heads of finance, education, nursing, research and HR. It is an approach reflected at the top of the organisation, where Professor Smith works alongside managing director Claire Perry - former chief executive of Lewisham Hospital trust.

The rise of the clinician manager or "physician executive" is in Professor Smith's view a necessary corrective to the mistakes of the past 25 years. "In the UK, we've created a culture of [NHS] management that, if not actively anti-professional, sees professionals as a workforce to be worked and has little interest in academic endeavour or innovation."

He acknowledges the rise of general management has to be seen in the context of the mid-1980s: "You did have a health service that was managed by doctors in an amateur fashion. You needed a great input of management. "The management that came in introduced a much sharper structure, but it [also] excluded the professionals from the process. So you ended up with a disenfranchised and angry clinical workforce that managers had very little control over."

Professor Smith says that culture has been re-engineered at Imperial. "At the start clinicians were completely unbelieving. They'd say to me, 'you've got to do this or that' and I'd say, 'I don't have to do anything, you're in charge now'." One of the keys to the success of this approach is that all clinical programme group directors must remain active clinicians. "We've been careful to ensure clinicians who become managers are not seen as having gone to the dark side", he explains. "The minute you stop practising, you lose credibility with clinical colleagues."

"Only clinicians can deliver real change," he adds, pointing to the impact on the trust's accident and emergency performance. Before the merger, up to 10 per cent of A&E attendees were waiting more than four hours to be admitted. Among the major changes were increased consultant ward rounds. "As a manager, telling a consultant to do a ward round every 12 hours is next to impossible. As a fellow professional, it's much easier."

The Imperial chief executive admits he was worried about sending the wrong message to managers - "that they would lose control now that these ogre clinicians were in charge". However, he says the new arrangement has created an even greater focus on their contribution. "Managers in the health service are actually very good project managers".

Professor Smith says that Imperial has a ferocious commitment to outcome measures and patient satisfaction, and ensures that each of the professional groups knows how it will be "judged". He stresses that this is not about appropriating blame. Instead, he says: "We ask the clinicians why something is not working and what they think the answer is."

Smith calls for truce with private practice

Professor Smith has another of the health service's hottest topics in his sights: private practice. "We've got a schizophrenic view of private practice in the NHS. It has produced several unfortunate consequences. The first is that the power of the paying patient doesn't exist in the NHS.

Another "consequence" is that in other countries income from private practice is used for the benefit of the state, while in the UK it "goes to the shareholders of private agencies. "At places like Johns Hopkins a very substantial part of their research activity is driven by profits from private practice."

Professor Smith regrets that the NHS and private practice have become "deadly foes" locked in competition. "If we can change that - then we could see private practice [in the NHS] as not a bad thing, which I don't believe it is. Secondly, we could ensure the [NHS] organisations that employ the doctors who do the private practice could gain some profits."

He stresses these revenues would come from charges normally levied by private health providers, not from doctors' fees. "We think there is a win-win. Providing care for all your patients in one facility is a much safer way of doing it. I think clinicians needs to stand up and say that, while private health providers will lose money, the NHS will gain."

3. Methods

We adopted a two phase approach to the scoping review: a structured literature search of key journals (Phase I) and a search of electronic databases (Phase II). The first phase was based on high-impact peer reviewed journals, authors and groups while the second phase was based on key terms across a broader health literature. A thematic coding framework emerged from detailed reading and discussion of management literature in Phase I which was then mapped to health literature.

3.1 Phase I - Structured Search

The search strategy and criteria for Phase I were agreed among the three-person research team plus librarian. The broad-based management stream of journals was tackled first and the health stream was considered separately. With reference to impact factors through the Association of Business Schools list of ranked journals and Web of Science, the team selected 9 health and 20 international management journals. Health covered social science, medicine, health service research, quality, administration and informatics. Management journals included titles that cover organisation, management, management learning, information, HR, human relations and knowledge management. At this stage we identified a number of reviews and syntheses of literature in the knowledge management field that have been used as reference points for comparison: Nicolini *et al*, 2008; Mitton *et al*, 2007; Greenhalgh *et al*, 2005. (See section 3.3).

3.1.1 Abstracts/Titles leading to Full Papers

The librarian conducted a hand search of journals on-line and downloaded titles and extracts. The search generated 414 management and 171 health and social science abstracts/titles, totalling 585 items. The three researchers independently read and evaluated the titles/abstracts, assessing the relevance of each to the project and voting for its inclusion/exclusion in the review. It was a subjective assessment, validated by discussion among the team when we compared our votes and rationale. We erred on the side of inclusion rather than exclusion by altering our vote in response to a reasoned argument. (This happened in 15% of management cases and 10% of health cases.) Full papers were obtained for abstracts that attracted two votes.

Papers were not included where the abstracts related to clinical trials or narrowly biomedic-scientific studies. As the orientation was research utilisation and knowledge mobilisation among healthcare managers, we excluded the small number of titles that dealt with patient utilisation of evidence. The emphasis was upon use of evidence, research and knowledge. The literature addressed extensively the allied question of what constitutes evidence and knowledge, and epistemological questions of how we know what we know. We were interested in finding papers that offered reviews and syntheses of earlier literature, and we wanted to explore conceptual models and theoretical frameworks where they existed.

The loose terminology that covered the field meant that we needed to include management, translation, transfer, exchange, utilisation, mobilisation, transformation and diffusion as verbs, and knowledge, research, evidence,

information, innovation and learning as nouns. We could not be too tight in our formulation of inclusion criteria at this stage. These terms informed the librarian's search.

Inter-rater consistency was higher in the health field (at 71%) than in the management field (at 55%) where the literature was diffuse and we had little sense of organising topography or terrain at this stage. The health literature badged itself more clearly in its concern with evidence, research or, sometimes, knowledge management.

We emerged with a set of 183 management and 68 health-related papers, totalling 251. They were supplied to researchers in chronological form, batched in years from 2000 up to 2008, with management and health streams supplied separately. The chronological nature was felt to be important to allow us to obtain a sense of narrative development in the field over time. The review was extended pre-2000 by snowballing references from the selected papers.

3.1.2 Thematic Coding

Each of the three reviewers took the papers and tried to assign a thematic framework. A dominant framework emerged, based on the categories identified by the principal investigator (PI). These distinguished between theoretical perspectives, sorting papers, for example, between Resource Based View of the firm, organisational forms and communities of practice. Identification of these perspectives required a prior understanding of the field, rather than confronting it as a *tabula rasa*.

Negotiated Framework

Negotiation was nevertheless required to gain some common understanding of the categories and to synthesise the proposed categories from each of the three researchers. Nature of Knowledge and Knowing, for example, was condensed into a single field from typology of evidence (levels of evidence, guidelines, types of knowledge) and epistemology (linguistics, philosophy, hermeneutics, how we know). It was not apparent at the outset whether a classification would emerge on the basis of unit of analysis (individual, group, organisation, environment), discipline (psychology, anthropology, economics), vector (process and flow *versus* stock) or focus (knowledge, research tradition, people, processes). The instinct to find an ordered taxonomy that cross-tabulates dimensions in a dualist (mutually exclusive) fashion is strong, and we observed repeated (and useful) examples of taxonomies in the literature. Each of us also approached the task with a mental map based on previous experience and study, e.g. economics and performance, psychology, history, organisation and management, information science and knowledge management, that we brought to bear on the task. It was necessary to find a framework that accommodated this multi-disciplinary perspective.

Evolution and Clarification

The categories, or domains as we have labelled them, emerged through the process of coding. Over a sequence of meetings the research team worked through the set of 250 papers, starting first with the management stream. It was a discursive approach in which each researcher had considered the papers in advance and marked a provisional coding, based on the initial negotiated framework. These were then discussed and compared, with the result that there was a degree of clarification, evolution and extension in the coding system over

time which resulted in re-evaluation of early classifications once the ten domain set had been finalised. Each paper was assigned to only one category, regarded as the dominant one. So for example, a review of types of knowledge in the context of advancing thinking and technical solutions involved in building knowledge management systems (Alavi and Leidner, 2001) was coded to our domain IS/IT rather than nature of knowledge and knowing.

Rationalising the Discourse

The literature itself helped to make sense of the discursive approach that we adopted in generating domains, and assisted in articulating the rationale. We adopted an inductive and pragmatic approach that allowed for ambiguity, since papers did not form themselves neatly into either-or compartments. We thus rejected (or at least did not adopt) a dualist 'this but not that' analysis (Orlikowski and Robey, 1991) which is frequently used as a "theoretical scaffolding for schemes of classification, taxonomies, and contingency theory" (Kondo, 1990). The categories are not mutually exclusive in their content and, while representative of certain disciplines, e.g. economics in Resource Based View of the firm, and psychology in cognition and organisational learning, are not determined by them, not least because academics morph their own disciplines by moving, for example, from sociology to management studies.

Health Literature

The coding was developed in relation to the management literature, providing a comparative dimension to the study since we are able to compare and contrast the shape of the health sectoral literature with reference to the generic management field. The coding was extended in health to allow for the Evidence-Based movement which is specific to public sector and biomedical research. The grey literature that sets the macro dimension for health research and knowledge, in terms of universities, research funding programmes and government initiatives, led to a further domain to be identified as Super-Structure, which may be conceived of as a *deus ex machina* that distinguishes health from the private sector. The largest unit of analysis in generic management literature tends to be the organisation/firm (with exceptions e.g. Lam, 2000).

3.1.3 Reporting and Exemplar Papers

Papers within this scoping review often contain precise and refined theoretical structures. We have used over-arching domain types to organise the literature. Application of such umbrella concepts, e.g. RBV or CoP, carries risks (Hirsch and Levin, 1999) of losing or conflating distinct logical processes. We try to avoid this by incorporating detailed accounts of content. We also present abstracts of exemplar papers, which have been selected on the basis of quantitative and qualitative criteria in each domain:

- **Quantitative** – the most cited paper: using the objective criterion of citation counts drawn from Web of Science, we select the paper ranked as having been cited most times by other authors in peer-reviewed journals (at March 2009). Citation counts are shown in Appendix 1;
- **Qualitative** – interesting: using the subjective perceptions of the research team, we apply criteria of our response to the paper, significance of author, extent to which the paper is representative of the theme.

Box 4. Phase I Journals

Management:

1. The Academy of Management Journal
2. The Academic of Management Review
3. Administrative Science Quarterly
4. British Journal of Management
5. European Journal of Information Systems
6. Harvard Business Review
7. Human Relations
8. Human Resource Management
9. Information and Management
10. Information Systems Journal
11. Journal of Information Science
12. Journal of Knowledge Management
13. Journal of Management Studies
14. Journal of the American Society for Information Science & Technology
15. Knowledge Management Research & Practice
16. Management Learning
17. MIS Quarterly
18. Organisation Science
19. Organisation Studies
20. Strategic Management Journal

Health and Social Science Journals:

1. BMJ
2. Social Science & Medicine
3. JAMA (Journal of the American Medical Association)
4. Journal of Health Service Research & Policy
5. Milbank Quarterly
6. Quality in Health Care
7. Journal of American Medical Informatics Association
8. Public Administration
9. Quality & Safety in Health Care

3.2 PHASE II – Database Review

The methodology of Phase I takes a structured approach based on high quality peer reviewed journals. The papers are academic in their focus, and by their nature are written by academics for other academics. This review is not an empirical study and so it is not our brief to access practitioners directly to find out how they utilise research. Nor was it scoped as a systematic review, which would have generated thousands of items from world literature and required a complex and resource intensive search strategy using controlled vocabulary, e.g. MeSH terms (Medical Subject Headings, based on Library of Congress classification of subject indexing terms), as well as key words and free text.

We adopted a structured database search (which could also be described as a limited systematic search) in Phase II, tailored to research and review articles and capturing the grey literature, using standard terms and free text language. The search strategy was developed by the specialist librarian, based on discussion with the team, using strings that include knowledge management, transfer, sharing, capture, utilisation, mobilisation, exchange, transmission, translation, diffusion, implementation; research, evidence. US and UK spellings were accommodated in the search. (See box below). The search was executed using

OVID, accessing Medline, Embase, HMIC and CINAHL databases. It produced 548 abstracts and titles.

Box 5. Phase 2 Search Strategy

Search Strategy: Ovid (Medline, Embase, HMIC & CINAHL)

1. knowledge management.mp. [mp=title, other title, abstract, heading words]
2. knowledge transfer.mp. [mp=title, other title, abstract, heading words]
3. knowledge sharing.mp. [mp=title, other title, abstract, heading words]
4. knowledge capture.mp. [mp=title, other title, abstract, heading words]
5. knowledge utili\$.mp. [mp=title, other title, abstract, heading words]
6. evidence utili\$.mp. [mp=title, other title, abstract, heading words]
7. research utili\$.mp. [mp=title, other title, abstract, heading words]
8. knowledge implement\$.mp. [mp=title, other title, abstract, heading words]
9. evidence implement\$.mp. [mp=title, other title, abstract, heading words]
10. research implement\$.mp. [mp=title, other title, abstract, heading words]
11. knowledge mobili\$.mp. [mp=title, other title, abstract, heading words]
12. knowledge exchange.mp. [mp=title, other title, abstract, heading words]
13. knowledge transmission.mp. [mp=title, other title, abstract, heading words]
14. knowledge translation.mp. [mp=title, other title, abstract, heading words]
15. knowledge diffusion.mp. [mp=title, other title, abstract, heading words]
16. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15
17. remove duplicates from 16
18. limit 17 to english language
19. limit 18 to human
20. limit 19 to yr="2000 - 2008"
21. limit 20 to "review articles"
22. limit 21 to humans
23. limit 22 to research

3.2.1 Sifting and Coding

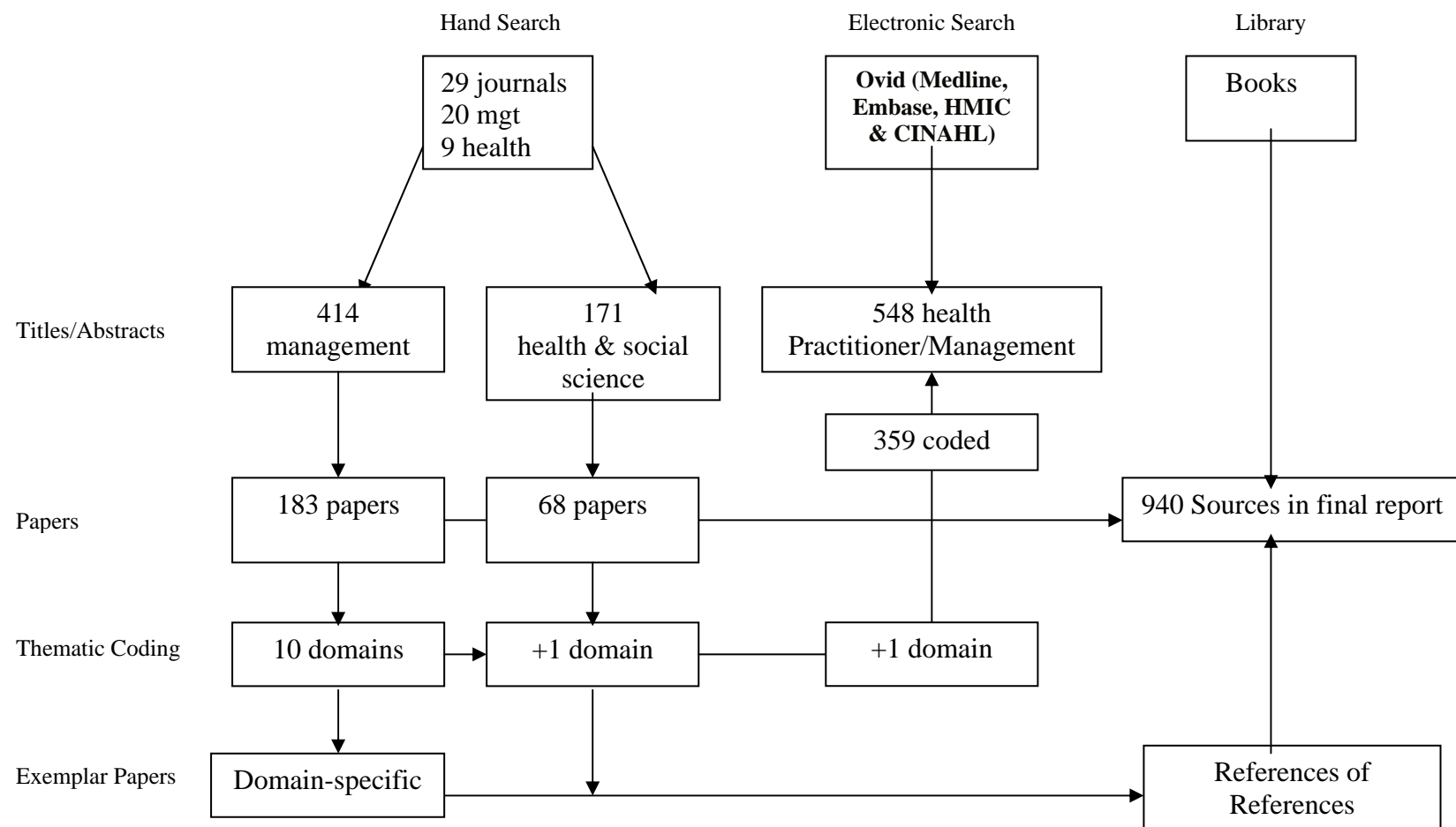
The Phase I process had been collaborative and instructive, so that by the end of the process there was a common understanding of the analytical and thematic framework, (demonstrated by a process of convergence which took place over successive meetings).

The experience of Phase I provided the grounding to enable one researcher to sift and code the Phase II abstracts/titles. Phase II was an exercise in casting the net widely across the health field, eliciting 548 titles/abstracts compared to the 171 culled from Phase I across health journals. Much of the literature is practitioner-based, reporting on implementation and, in terms of the bench to bedside spectrum of research into practice, situated nearer the bedside than the bench.

Out of 548 items, 189 were either not relevant to the review (e.g. biomedical scientific or pharmacological studies) or lacked an abstract, leaving 359 (66%) within the field to be coded and mapped to the categories devised in Phase I.

It should be noted that this search was supplementary to Phase I, and did not mimic every aspect of the methodology. We coded and classified papers on the basis of abstracts rather than full papers.

Figure 4. Flow Diagram Summarising Methods



3.3 Comparing Methods with Other Reviews

How do existing reviews compare with our theme? We consider three recently published literature reviews that consider similar (but not identical) questions.

Box 6. Nicolini *et al* (2008) - Managing knowledge in the healthcare sector: A review

Systematic review of KM in healthcare over 6 years 2000 – 2006 looking at business/management and medical literature:

Stage 1: Search CINAHL, Medline, Embase, Business Source Premier, Science Direct and ABI Inform

700 hits, identified 178 articles for further examination

Stage 2: thematic coding based on preliminary reading and discussion

Stage 3: analyse literature in each thematic area

Findings:

Segmentation along three disciplinary lines:

- Information sciences
- Business and management
- Medical and allied health sciences: prevalence of contribution from the medical sciences

Healthcare Themes

- Nature of knowing in the healthcare sector
 - o Fragmented and distributed nature of medical knowledge
 - o Proliferation of medical knowledge
 - o Importance/preference of local knowledge (tacit and proximal)
- Benefits and pitfalls of specific KM tools
 - o Not theoretical: IT, social-learning, education and training
- Barriers and enablers of KM in the healthcare sector

Box 7. Mitton *et al* (2007) – Knowledge Transfer and Exchange: Review and Synthesis of the Literature

Method:

1. search for abstracts
2. select articles through a relevancy rating process
3. classify and rate the selected articles
4. synthesize and validate them

Searched: eight databases for English-language abstracts from 1997 to 2005: Medline, EMBASE, Cinahl, PsycINFO, EconLit, the Cochrane Database of Systematic Reviews, sociological abstracts, and social sciences abstracts.

Terms: knowledge generation, knowledge translation, knowledge transfer, knowledge uptake, knowledge exchange, knowledge broker, knowledge mobilisation

Compared to our review : excludes knowledge management, sharing, capture, implementation, transmission, diffusion, utilisation; research utilisation, evidence utilisation,

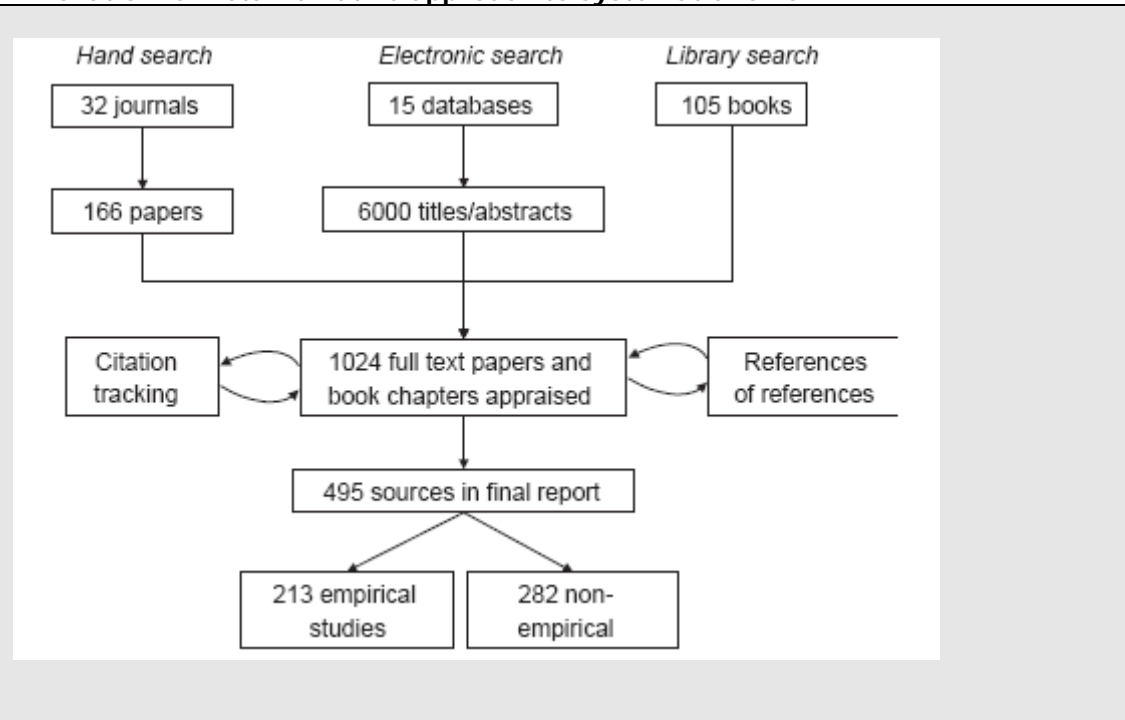
We exclude: knowledge broker

Conclude: our Phase 2 review contains broader range of search terms but on fewer databases

- Initial search: 4,250 abstracts

- Reviewed 169 papers
- Selected 81 studies:
 - o 18 implementation
 - o 63 non-implementation
 - Organising frameworks for applying KTE strategies
 - Barriers and facilitators
 - Methods and issues for measuring impact of research studies
 - Stakeholder perspectives on what works and what does not work

Box 8. Greenhalgh *et al* (2005) - Storylines of research in diffusion of innovation: a meta-narrative approach to systematic review



4. Overview of the Findings

This section introduces the findings by giving a thumbnail sketch of each domain and goes on to show how the domains fit into the methodology.

4.1 Thumbnail Sketches

Ten categories were identified in the management literature search and a further two in health literature.

4.1.1 Management Literature

The ten domains described here were all observed in the Phase 1 search of the generic management literature.

Nature of Knowledge and Knowing

Both the management and the health literatures reflect hard on the question “what do we mean by ‘knowledge’?” We have identified a specific domain to capture papers primarily concerned with this question, and it emerges as the largest single category.

The tendency is to invoke a hierarchy of data-information-knowledge (Bell, 1999) as a continuum in which “data require minimal human judgement, whereas knowledge requires a maximum judgement” (see Tsoukas & Vladimirov, 2001). Knowledge is connected to knowing, extending the philosophical and epistemological nature of the question ‘what is knowledge and how do we know what we know?’ A prominent response in the literature is a distinction between tacit and explicit knowledge, attributed to Polanyi (1962) and developed by Nonaka (1994). This polarity of opposites leads to a typology (e.g. Gourlay, 2006) of soft-hard, inarticulable-codifiable which approximates the knowledge-data distinction. We could characterise this distinction by pointing to IS/IT on the one hand and communities of practice on the other, where syntax is required to communicate codified IS/IT knowledge and ‘embedded practice’ is conveyed through ‘situated learning’ in communities with shared goals. This stereotype is too crude, because IS/IT needs to factor in human behaviour and culture while tacit-explicit may not be mutually exclusive dimensions, but it provides a useful headline means of distinction.

Information Systems and Information Technology

Information science is typically characterised as an insular discipline that is not well cited in other academic fields (Jashapara, 2005). It is action rather than theory-driven and its relationship to codified knowledge and application lends itself to ‘toolkits’ and implementation frameworks. Technology in knowledge management is conventionally used to create a repository of ‘structured knowledge’ (Davenport and Prusak, 1998). Information systems that take the form of Knowledge Management Systems (KMS) go beyond technology, with an implicit or explicit philosophical base, and serve the non-technical world of people (e.g. Alavi & Leidner, 2001).

Communities of Practice

While IS/IT might be associated with codified knowledge, ‘communities of practice’ are associated with tacit knowledge. The concept describes the process

of shared learning and practice, or situated learning, that occurs when groups of people with common objectives interact and work together. It has become highly influential in the literature as a means of conceptualising how sub-units or groups within firms or organisations operate, rooted in the work of Lave and Wenger (1991), cognitive anthropologists, who investigated how cognitive activity is related to social context.

Lindkvist (2005) distinguishes 'tightly-knit' (Brown and Duguid, 1998) communities of practice from loose groups of individuals coming together to complete a project, who might be described as 'knowledge collectivities' or 'collectivities of practice'.

Communities of Practice may typically be regarded as a sub-unit of an organisation, operating at a micro level. If an organisation is a set of generalised rules in which "rules of action are typified responses to typified expectations" then CoP could represent "organisation-as-theory", according to Tsoukas and Vladimirou (2001). When linked together they form a network, described by Brown and Duguid (2001) as 'networks of practice'. The 'sticky' nature of tacit knowledge which makes it difficult to transfer and absorb, may be circumvented, since network connections provide horizontal conduits for flow of knowledge across organisations. Individual members of CoPs stand at the intersection between organisation and network (p206), which may spill into a wider 'epistemic community'. Brown and Duguid note that 'communities of practice will become ubiquitous sources of knowledge driving organisational change' (p208).

Organisational Form

It is apparent from discussion of CoP that Organisational Form is not a self-contained category, since CoPs are components of organisational form, especially in their manifestation as a network. The category of Organisational Form is assigned where knowledge management is being considered in the context of a particular structure or where the question is 'what impact does organisational form have upon knowledge management?'

The word 'firm' and 'organisation' are interchangeable because the literature is predominantly based in the management world of private sector organisations, where interest in knowledge is motivated by competitive advantage. Out of the 17 papers assigned to this domain, most focus on particular organisational structures or settings, e.g. Joint Venture firms in strategic alliances; knowledge-intensive-firms (KIF), often described as professional service firms (PSF), referring to consultancy companies. There is an East-West dimension, with particular interest in Toyota as a case study (Dyer *et al*, 2000) or making global contrasts between organisational form and types of knowledge. Unlike the domain Nature of Knowledge and Knowing which was mainly conceptual, the majority of papers (11) in the Organisational Form domain are empirical, exploring case studies using questionnaire and interview methods.

The way that organisations are linked is a function of form, whether it is through a market, a network or a hierarchical structure (Adler, 2001). Just as we can ask whether form impacts upon knowledge management, it is feasible to ask whether characteristics of knowledge predict organisational form (Birkinshaw *et al*, 2002), to which the answer appears to be 'yes'. Birkinshaw addresses this empirically in a highly specialist environment of R&D units in 15 Swedish multinational firms, looking at specific dimensions of knowledge observability and 'embeddedness'. Adler draws a broader typology linking structure with control (hierarchy/authority, market/price and community/trust) in which knowledge intensive firms would be expected to thrive on relationships relying on trust as the key to

creating and transferring knowledge.

Organisational Learning

The relationship between organisational form and knowledge type is also relevant to the 'Organisational Learning' domain. Lam (2000) develops a model that links knowledge type with micro-level learning activities and organisational form. Japanese models are represented in the 'J-form organisation' where project teams conform within a hierarchy. 'Operating adhocracy', including management consultancies, is individualistic, innovative but unstable, while 'professional bureaucracy' is individualistic, stable but not innovative. 'Learning' is a term that harnesses the human dimension of knowledge, especially tacit knowledge, that distinguishes it from 'transfer' where knowledge is commodified. It implies a cognitive and therefore psycho-social dimension.

Resource Based View of the Firm

RBV was initially promoted by Penrose (1959). The strategic management literature has built upon this perspective (Cole 1998; Spender 1996a, 1996b; Nonaka and Takeuchi 1995). The organisation equals the firm, driven by economic discourse, which is underpinned by a concept of value and competitive advantage. Core principles of the resource-based view are that "resources and capabilities which are simultaneously valuable, rare, imperfectly imitable and non-substitutable – the VRIN conditions – are the main source of above-normal rents and competitive advantage (Barney, 1991; Wernerfelt, 1984)" (Easterby-Smith & Prieto 2006, p236). It is given some empirical support by McEvily and Chakravarthy (2002) who test the resource-based theory that "intrinsic characteristics of resources and capabilities, such as their tacitness, complexity, and specificity, prevent imitation and thereby prolong exceptional performance" (p 285).

RBV is largely driven by economic theory, but the role of knowledge as a resource has gone beyond the conventional territory of productive and allocative efficiency. The recent concept of 'dynamic capability' addresses the processes by which knowledge is exploited (Sher & Lee, 2004), linked to 'absorptive capacity' of the knowledge consumer (Lenox & King 2004). The role of knowledge in building 'social capital' has been taken up by other disciplines, (e.g. business, sociology, organisational behaviour and human resources management) in theorising how value is present within and between individuals and social networks, with an impact on productivity (e.g. Widen Wulff & Ginman, 2004). The distinction between stocks and flows, comparing resource-based and relational views (Mesquita *et al*, 2008), is also discussed in terms of organisational form, looking at knowledge sharing in strategic alliances (Connell *et al*, 2007).

Ambrosini & Bowman (2001) use a multi-disciplinary approach, including ethnographic, narrative and cognitive methods drawn from psychology, as a proposed method for operationalising tacit knowledge. The underlying premise is that tacit knowledge, in theory, lies at the base of sustainable competitive advantage, locating it in RBV of the firm. The lack of empirical evidence to support the theory is partly due to difficulty in measuring tacit knowledge, which the authors seek to address as a basis for future research.

Critical Theory

Critical theory is a body of thought that stands in opposition to the resource-based view of the firm and the notion that knowledge is a commodity that can be transferred to confer improved performance and competitive advantage. It

highlights the contestability of management knowledge and the limits of technology (e.g. Currie *et al*, 2004). Alvesson and Kärreman (2001) juxtapose 'knowledge' and 'management' as an 'odd couple' in which knowledge is inherently difficult to manage, concluding that 'knowledge management' really amounts to managing and controlling people. Schultze and Stabell (2004) depict critical discourse as being focused on labour in a power struggle with management, and inclined towards dualist value judgements of good and bad. Health care organisations are prominent as sites of enquiry exploring, for example, NHS Direct (Hanlon *et al*, 2005).

Knowledge Transfer and Performance

Knowledge transfer takes a positivistic approach where knowledge is a commodity or an asset that can be transferred between individuals and organisations. The approaches vary, drawing on IS/IT (Braganza *et al*, 2007), systems-analysis (Parent *et al*, 2007), and learning (Muthusamy *et al*, 2005; Lervik and Lunnan, 2004).

The vocabulary is wide-ranging: transfer is alternatively described as diffusion, sharing (Christensen, 2007), mobilisation, process, and may be related to creation and adoption of innovation (e.g. Goh, 2005). By 'positivistic' we mean uncritical in drawing a link between knowledge transfer and performance, effectiveness or advantage (e.g. Gravier and Strutton, 2008; Rhodes *et al*, 2008; Chen and Chen, 2006; Lervik and Lunnan, 2004; Lin, 2007; Rodan *et al*, 2004; Syed *et al*, 2004; Dyer *et al*, 2006; Bogner 2007; Chang Lee *et al*, 2005). KT is therefore rooted in RBV.

We identify the link between knowledge transfer and performance as one of growing interest in the literature, illustrated by the prevalence of papers in the latter part of our review period (2004-2008) rather than the first half of the period (2000-2003). We observe a trajectory over the review period in which the KM field has become increasingly relational in its focus on tacit knowledge and situated learning. It has also grown in abstraction and divergence by exploration of knowledge as a socially constructed reality, emphasising the role of context and interpretation. At the same time, the hard-edged utilitarian side of knowledge has been developed, with a strong empirical interest in resource-based theories shown in this domain.

Barriers to Knowledge Transfer and Facilitators of Organisational Development

This domain reflects the processual nature of knowledge management, but also emphasise a dimension of change or resistance. The unit of analysis of researchers is often the people (e.g. Leiter *et al*, 2007) or the organisation (e.g. Lin *et al*, 2008), leading us to group organisational development and barriers into a single domain.

Barriers to knowledge sharing are a prominent topic of interest (more so than enabling factors) and culture is cited as one of the most significant barriers. The term 'culture' is criticised by Hall and Goody (2007) as a "catch-all category to account for failed efforts to promote knowledge sharing within organisations" (p182), use of which makes it "possible to hint at issues of power without addressing specific power relationships" (p184).

The domain is largely empirical (7 out of 10 papers), addressing flows and barriers by means of interviews and questionnaires. Healthcare organisations have been sites of enquiry in 4 of the 7 empirical papers. Hospitals have been

fruitful locations in which to consider power and resistance to change, focusing on implementation of information systems (Doolin, 2004) or business process re-engineering (McNulty, 2002). Sociology, human relations and management learning drive this field rather than economics.

Culture, Anthropology and Conversation Management

The final domain to emerge from our inductive approach to classification of management literature in Phase 1 is 'culture, anthropology and conversation management'. It is a moot point whether papers on cultural barriers (e.g. McDermott and O'Dell, 2001) belong here or in the previous domain. Papers share a concern with knowledge boundaries, communication and shared values, which lends itself to ethnographic and anthropological approaches. Carlile (2002) spent months observing product developers in a specialist part of the automobile industry. Mengis and Eppler (2008) have reviewed the literature on conversation management while van den Hooff *et al* (2004) found that communication climate is a key variable in their empirical study of knowledge sharing.

The domain is populated by only 4 papers, reflecting the limited use of anthropological methods, but also the dominance of other specific themes such as Communities of Practice (e.g. Orlikowski, 2002; Bechky, 2003) where ethnographic techniques have been employed.

4.1.2 Health Literature

The health literature threw up new themes, described as Evidence Based Healthcare and Super Structures.

Evidence Based Healthcare (EBHC)

Evidence based healthcare started with an emphasis upon Evidence Based Medicine that gained momentum in the 1990s. At the beginning of our review period, an interest in Evidence Based Management had been established (e.g. Walshe & Rundall, 2001). The distinction between medicine and management is not cut and dried, especially in the practitioner literature which tends to have a clinical focus. Evidence based approaches represent a drive to use scientific evidence to support decision-making. The term 'evidence' is common in health sector papers but rarely features in generic literature. The theme of EBHC was prominent in both Phase 1 and Phase 2 of the health literature search.

Super Structures

The Phase 2 electronic database search produced a further domain that represents the infrastructure of institutions and funding that commissions healthcare research, e.g. the NHS SDO programme (much of which has been reported through grey literature in Chapter 2).

4.2 Reprise of Methods

The methods are reprised in this Overview chapter in terms of search, coding, quantification and reporting. Papers have each been assigned to one domain, for purposes of grouping (coding) and counting.

4.2.1 Search – The Two Phased Approach

We adopted a two phase approach to the scoping review. The first phase was a structured search of 29 high impact journals, with 20 in management and 9 in health. This involved a hand search of journals, drawing out titles that were concerned with knowledge, research, evidence, learning in organisations. The search generated 585 titles and abstracts. Through a process of collective evaluation by a team of three researchers we selected 251 papers for more detailed review. This proportion of 43% (251/585) was consistent across both sectors of the literature, i.e. 44% (183/414) in management and 40% (68/171) in health and social sciences.

Phase 2 was designed as a supplementary tool to ensure comprehensive capture of themes. It used a systematic approach, which we describe as a structured database search, to capture a broader base of literature including grey literature and practitioner journals. Search terms included knowledge+ management, transfer, sharing, capture, utilisation, mobilisation, exchange, transmission, translation, diffusion, implementation; research and evidence utilisation and implementation. It was executed through OVID, accessing Medline, Embase, HMIC and CINAHL databases and produced 548 abstracts and titles.

Phase 1 was intended to achieve depth by concentrating on peer-reviewed articles in high quality journals. They are written by academics for other academics and are theory-driven. Phase 2 achieves breadth and is not restricted to peer-reviewed articles. It is oriented towards practitioners rather than academics and is less theoretically-based. This phase produced an extra domain (Super Structures) and generated Chapter 2 on policy and infrastructure.

4.2.2 Coding - Assigning Thematic Domains

Ten thematic categories emerged in the management literature and a further two in the health literature. They are not mutually exclusive and were derived inductively. There was no pre-designed matrix and we did not construct a dualist either/or typology. Much of the literature is itself trying to construct a typology of types of knowledge along two dimensions of dualism following, as Alvesson and Kärreman (2001) describe it, “[t]he inclination to divide knowledge up in a four-fielder” (p1000). Our domains cross-refer to each other. In explicating them we include detailed accounts of papers and their arguments. The domains are named here with a summary of their focus:

Typology and Philosophical Enquiry into Epistemology

- Nature of Knowledge and Knowing: this is a line of enquiry that incorporates a wide-ranging debate about how we know what we know. Most papers in the KM literature are prefaced by a summary of the field, but a strand of the literature is preoccupied by the question of knowledge and how it applies to organisations. Papers that try to construct a typology of knowledge are included here.

Theoretical Discourses

- Resource Based View of the Firm: RBV conceptualises the organisation as a firm that seeks competitive advantage in the market place to survive and flourish. Economics is the dominant economic discipline and articles typically feature in ‘Strategic Management Journal’.

- Communities of Practice: CoP is a unit of analysis within the firm. Organisational Science is the dominant academic discipline, although the concept of CoP originated from anthropological studies (Lave and Wenger, 1991).
- Critical Theory: it seeks to locate sources of power and does not take at face value the virtue of managing knowledge. Its roots can be traced to Marxist theory (Lehr & Rice, 2002) and is polarised against the instrumental use of knowledge in pursuit of profit and, by extension, is out of sympathy with RBV. Sociology is the dominant academic discipline.

Disciplinary Movements

- Information Science and Information Technology: six of our twenty management journals are within the IS/IT discipline, e.g. European Journal of Information Systems. Most of the articles are assigned to other domains as their range of interest extends to Nature of Knowledge and Knowing, process of knowledge transfer and barriers to implementation. The minority of papers that are focused on use of IS/IT to manage knowledge are assigned here.
- Organisational Learning: OL is a school of thought rather than a specific theory. It is heavily represented through the journal 'Management Learning' and links cognitive processes to knowledge acquisition in organisations, drawing on psychology and social-psychology.
- Anthropology, Culture and Conversation Management: ethnographic studies are included here, although they do not form a large part of the field. 'Culture' is frequently cited as a barrier to knowledge transfer, so there is a distinct overlap between the two domains. Conversation management is not heavily represented in the literature. The dominant discipline of this domain is anthropology.

Flows, Processes and Structure

- Barriers to Knowledge Transfer and Facilitators of Organisational Development: There is no unifying discipline to this domain, which is concerned with the reasons why knowledge fails to transfer or the features that lead to organisational change. The focus is often on human resources and the journal 'Human Relations' is a typical conduit.
- Knowledge Transfer and Performance: this domain looks at the interfaces between organisations and how to enable knowledge transfer to improve competitive performance. It takes a positivistic approach, consistent with RBV rather than critical discourse. Papers feature across IS/IT journals and Strategic Management Journal among others.
- Organisational Form: the structure of organisations is not easily disentangled from other features, such as the processes by which knowledge is transferred, or the organisation as a medium for learning. However, where the form of the organisation was the focus of interest, e.g. whether network or hierarchy, or the particular features of Professional Service Firms, they were assigned to this domain. The journal 'Organization Studies' features most commonly here.

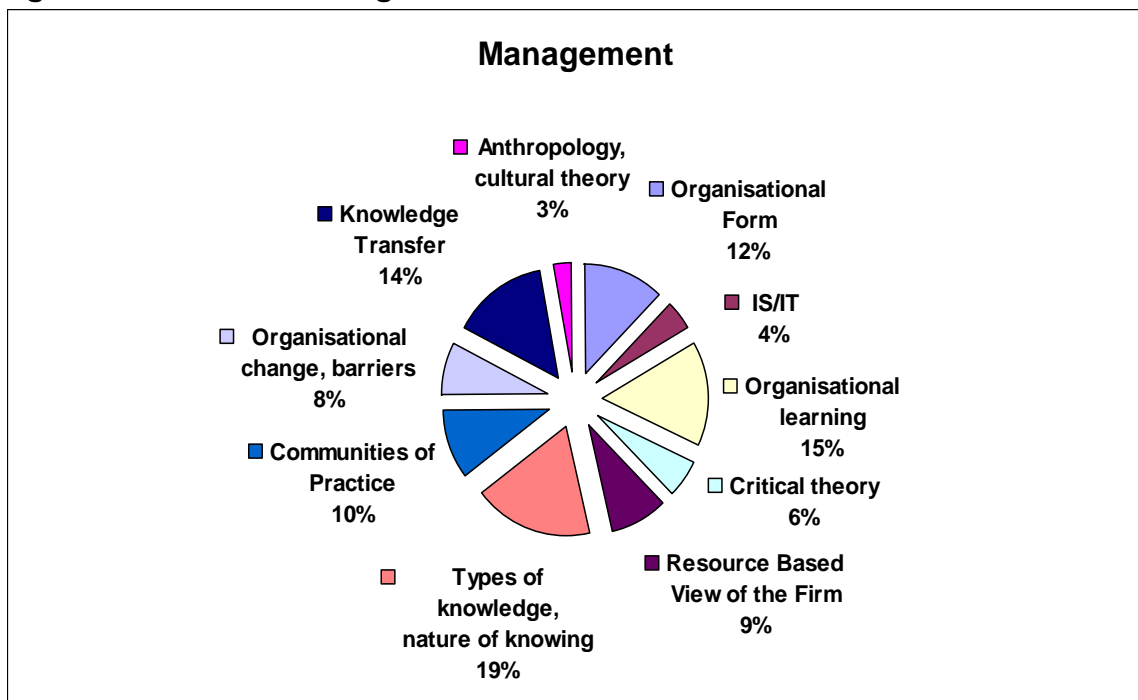
Extra Domains Relating to Health

- Evidence Based Health Care: 'evidence' is terminology that features heavily in health care, whereas 'knowledge' is the noun applied in generic literature. A body of literature, especially in the early part of the review period, is concerned with evidence based medicine and, subsequently, evidence based management.
- Super Structures: supply and demand for research, including funding bodies who commission research and the institutional response, function at a macro level that is rarely considered in the generic literature but is prevalent in health care research.

4.2.3 Quantification

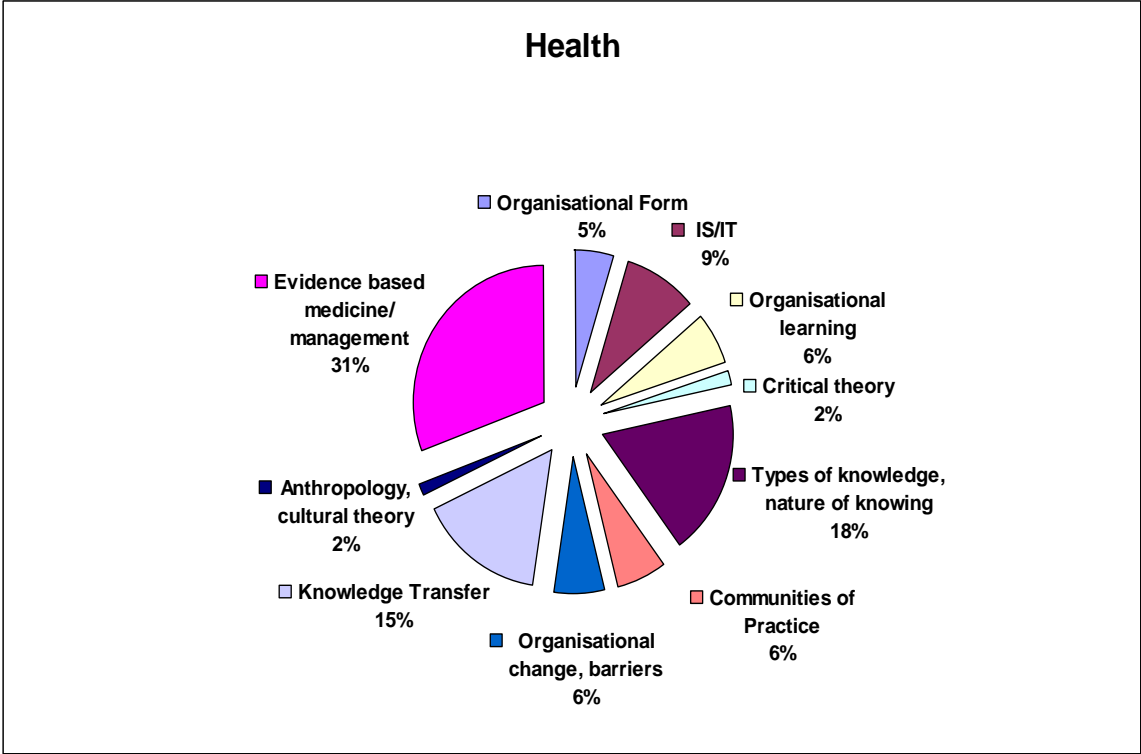
In the management literature (Phase 1) the biggest domain comprised Nature of Knowledge and Knowing (19%) while OL, knowledge transfer and organisational form each accounted for 11%-15% of papers. Specific theoretical perspectives of RBV, CoP and critical theory each accounted for 6%-10%, along with organisational change and barriers to transfer. The smallest domains resulting from our search were IS/T and anthropology/culture/conversation with 1%-5% of articles.

Figure 5. Phase 1 - Management Literature



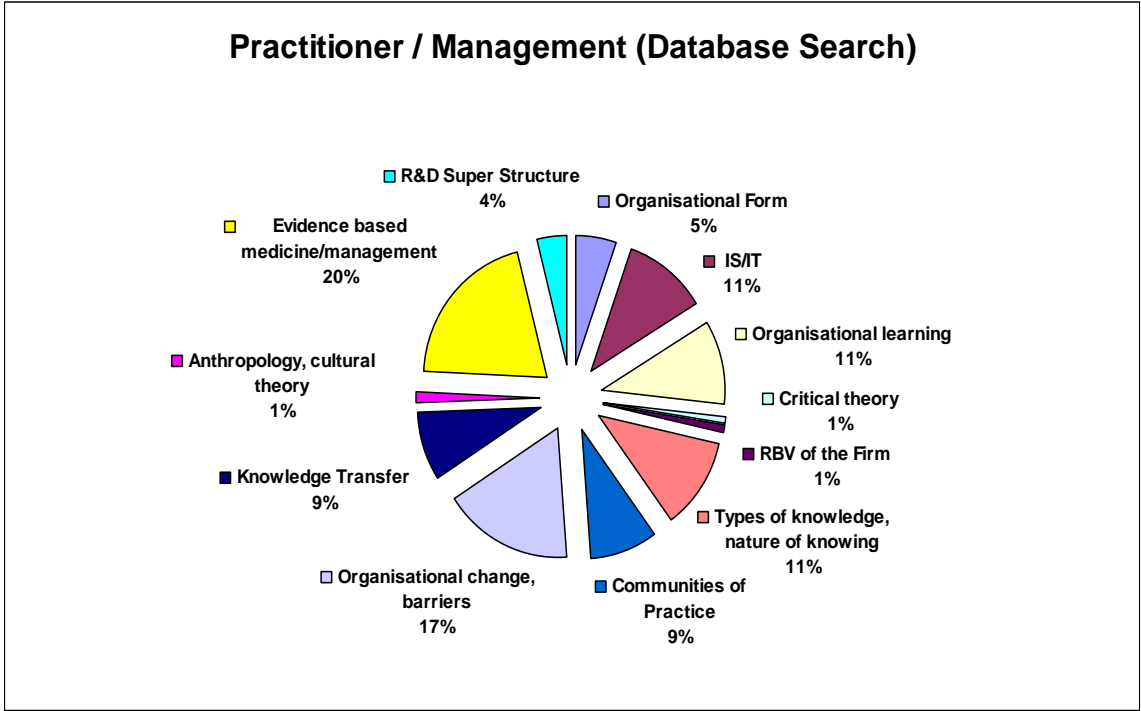
The health literature (Phase 1) is dominated by evidence based medicine/management (31%). Nature of Knowledge and Knowing (18%) and knowledge transfer (15%) are also areas of significant interest. IS/IT comprises a larger proportion of literature than in management, with 9%. The other domains or communities of practice, organisational form, organisational learning and organisational change & barriers each take up 5%-6% of papers. Critical theory hardly features (2%), and anthropology/culture/conversation, like the management literature is a small component (2%).

Figure 6. Phase 1 - Health Literature



The practitioner and other literature (Phase 2) is most interested in evidence-based health care and, running a close second, barriers to research utilisation and OD.

Figure 7. Phase II – Database Search (Healthcare)



4.2.4 Reporting

The domains represent a pragmatic method of describing and presenting the literature. Each paper is assigned to only one domain, for purposes of descriptive statistics and shaping the findings (summarised in Appendix 1), but in writing up the themes a paper may be referenced in several categories. For example, Orlikowski (2002) is the most highly cited author writing on CoP but her paper is also used to inform the Nature of Knowledge and Knowing.

Exemplar Papers

Exemplar papers have been used to signpost the nature of each domain in the management literature and were identified through two types of criteria. First, we identified the paper in each domain with the highest citation count, based on Web of Science. These tended to be papers at the start of our review period (that had had time to build up citations in other publications) which had achieved measurable impact. Secondly, we identified a paper of particular interest to this review or application to the field of health.

Comparing Management and Health Thematic Categories

We found that the two streams of literature shared an interest in the question of Nature of Knowledge and Knowing. The economics dimension (Resource Based View of the Firm) in the general management literature, represented by 'strategic management' or a search for competitive advantage, was absent in the health literature. The health literature, on the other hand, included a tranche of literature on Evidence-Based Medicine and Management that was absent from the management stream. It was also interested in the macro dimension and, specifically, in the relationship between demand and supply of research through funding agencies.

5. Nature of Knowledge and Knowing (Phase 1 Management Literature)

Spender believes that “we can use epistemology as a tool to cut into the discipline of knowledge management and expose its anatomy” (2008, p166)

This section addresses the questions:

- What is the nature of knowledge?
- How do we know what we know?
- What is organisational knowledge and knowing?
- Why do these questions matter?

5.1 What is the Nature of Knowledge?

This question is abstract and occupies a large space in the literature, grappling with the notion that knowledge is a “loose, ambiguous, and rich” concept that precludes reduction to simple sets of distinctions (Alvesson and Kärreman, 2001, p 1012).

Two dimensions emerge:

- Taxonomic – using an either/or categorisation using dualism (two polarised categories) or a continuum;
- Embedded capability – where there is mutual constitution between knowing and doing. Here, the distinction between ‘what is knowledge?’ and ‘how do we know?’ i.e. between knowledge and knowing, becomes inextricable.

5.1.1 Taxonomic

Conceptions of knowledge tend to start with the “Cartesian tradition which, first, emphasizes the role of the individual, rather than the group, insisting that learning takes place in an individual’s head” (Currie and Kerrin, 2004, p10). Cartesian dualism of mind and body, knowledge and sense, objective-subjective, is a familiar tradition, providing a spring-board to move from ‘knowledge as object’ to knowledge as subjective and then to being context-dependent through social construction of reality (Berger and Luckmann, 1966). At the ‘knowledge as object’ stage of the continuum, knowledge management emphasises how knowledge can be captured, represented, codified, transferred and exchanged.

Ackoff (1989) is credited, (by Spender, 2008), with developing the data, information, knowledge and wisdom (DIKW) typology. Bell similarly defines knowledge as a continuum from data to information to knowledge: “data require minimal human judgement, whereas knowledge requires maximum judgement”. Bell (1999, p.lxiv; in Tsoukas and Vladimirou, p 976) goes on to argue that ‘judgement arises from the self-conscious use of the prefix *re*: the desire to *re*-order, to *re*-arrange, to *re*-design what one knows and thus create new angles of vision or new knowledge for scientific or aesthetic purposes’.

Alavi and Leidner (2001) up-end the received wisdom that knowledge is the higher and more useful form. They suggest that knowledge is information that is processed and personalised in the mind of the individual agent to become knowledge, which then turns to information once it is made explicit, articulated in symbolic forms such as text and graphs. In other words, knowledge is a precursor as well as a consequence of information.

Polanyi (1962, p. 101, quoted in Tsoukas and Vladimirou, 2001, p 977) shows how uncontextualised data becomes patterned into information and then knowledge through study, interaction and experience:

Think of a medical student attending a course in the X-ray diagnosis of pulmonary diseases. He watches in a darkened room shadowy traces on a fluorescent screen placed against a patient's chest, and hears the radiologist commenting to his assistants, in technical language, on the significant features of these shadows. At first the student is completely puzzled. For he can see in the X-ray picture of a chest only the shadows of the heart and the ribs, with a few spidery blotches between them. The experts seem to be romancing about figments of their imagination; he can see nothing that they are talking about. Then as he goes on listening for a few weeks, looking carefully at ever new pictures of different cases, a tentative understanding will dawn on him; he will gradually forget about the ribs and begin to see the lungs. And eventually, if he perseveres intelligently, a rich panorama of significant details will be revealed to him: of physiological variations and pathological changes, of scars, of chronic infections and signs of acute disease. He has entered a new world. He still sees only a fraction of what the experts can see, but the pictures are definitely making sense now and so do most of the comments made on them.

Polanyi's insight is that knowledge is personalised and tacit: "we know more than we can tell" (Polanyi, 1958, 1966; quoted in Yates-Mercer and Bawden, 2002, p22). The distinction between tacit and explicit knowledge has become a major theme in the literature, stimulated by Nonaka (1994). "Nonaka's theory has achieved paradigmatic status since the mid-1990s ... as one of the best known and most influential models in knowledge strategy literature" (Gourlay, 2006, p1415). Tacit and explicit knowledge interacts in a spiral process of knowledge conversion that circuits through four sequential modes: socialisation, externalisation, combination and internalisation. Knowledge creation is a cumulative effect.

Alavi and Leidner's Taxonomy

Alavi and Leidner (2001) set out a taxonomy of knowledge perspectives: (1) a state of mind, (2) an object, (3) a process, (4) a condition of having access to information, or (5) a capability:

- Knowledge as a 'state of mind' is "a justified belief that increases an entity's capacity for effective action (Huber 1991; Nonaka 1994)" (p 109). This level of confidence based on experience and learning enables individuals to apply their knowledge to an organisation's needs;
- Knowledge as 'object' sees knowledge as a thing to be stored and manipulated;
- Knowledge as 'process of simultaneously knowing and acting' is similar to the notion of embedded practice in CoP but is pitched at an individual level of expertise;
- Knowledge as 'access to information' is an extension of knowledge as object, but with emphasis upon processes of transfer and retrieval;
- Knowledge as a 'capability with the potential for influencing future action' (Carlsson *et al.* 1996; Watson, 1999) suggests that knowledge represents the

capacity to use information; it may be selected and interpreted as a result of learning and experience.

They go on to develop a taxonomy of knowledge types based on tacit-explicit, individual-social and other dimensions, summarised in the box below.

Table 1. Taxonomy of Knowledge Types (Source: Alavi & Leidner, 2001, p 113)

Knowledge Types	Definitions	Examples
Tacit	Knowledge is rooted in actions, experience, and involvement in specific context	Best means of dealing with specific customer
Cognitive tacit:	Mental models	Individual's belief on cause-effect relationships
Technical tacit:	Know-how applicable to specific work	Surgery skills
Explicit	Articulated, generalized knowledge	Knowledge of major customers in a region
Individual	Created by and inherent in the individual	Insights gained from completed project
Social	Created by and inherent in collective actions of a group	Norms for inter-group communication
Declarative	Know-about	What drug is appropriate for an illness
Procedural	Know-how	How to administer a particular drug
Causal	Know-why	Understanding why the drug works
Conditional	Know-when	Understanding when to prescribe the drug
Relational	Know-with	Understanding how the drug interacts with other drugs
Pragmatic	Useful knowledge for an organization	Best practices, business frameworks, project experiences, engineering drawings, market reports

Gourlay's Taxonomy

Gourlay (2006) also sets out a taxonomy of dualist approaches to knowledge across a range of disciplines. His preferred framework is that of Dewey, in which tacit knowledge is associated with the everyday life world of non-reflectional behaviour, while explicit knowledge is aligned with reflective behaviour, described as 'phases of activity characterized by the conscious intent and attempt to analyse and describe some other experience or observed events with a view to communicating something to others, and perhaps for controlling those events.' (pp1430-1431). It is significant to replace 'knowledge' which, like motivation, can only be inferred, by 'behaviour' which is observable. Knowledge is a consequence of behaviour and is created through action or practice. It follows that knowledge is managed by managing behaviour.

Table 2. Taxonomy of Knowledge (Source: Gourlay, 2006, p 1426)

<i>Discipline</i>	<i>Knowledge-how</i>	<i>Knowledge-that</i>
Philosophy ¹	Knowledge-how; procedural knowledge; abilities	Knowledge-that; propositional knowledge
Philosophy (Polanyi) ²	Tacit knowing	Explicit knowledge
Psychology ¹	Implicit knowledge; tacit abilities; skills	Explicit knowledge; declarative knowledge
Artificial intelligence ¹	Procedural knowledge	Declarative knowledge
Neuroscience ³	Covert knowledge	Overt knowledge
Management studies ⁴ ; education ⁵	Tacit knowledge	Explicit knowledge
IT studies ⁶	Knowledge as process	Knowledge as object
Knowledge management ⁷	Know-how	Know-what
Sociology of science ⁸	Tacit; encultured (forms of life)	Explicit/symbolic

Source: ¹ Sahdra and Thagard (2003, p. 479); ² Gourlay (2004); ³ Weiskrantz (1997, p. 256); ⁴ Nonaka and Takeuchi (1995); ⁵ Alexander et al. (1991); ⁶ Kakiyama and Sørensen (2002); ⁷ Whitehill (1997); ⁸ Collins (1993, 2001b).

Spender's Taxonomy

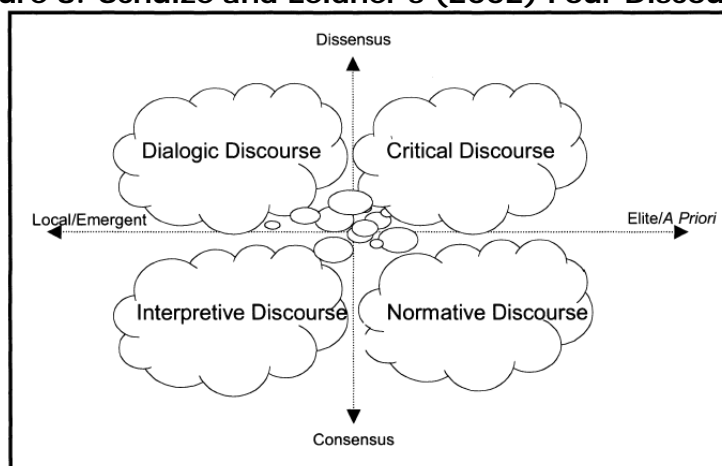
Spender (2007a in 2008) has defined an emerging typology as: knowledge-as-data, knowledge-as-meaning and knowledge-as-practice. He argues that distinctions between data, meaning and practice are better suited to knowledge management challenges than the DIKW hierarchical typology (Ackoff, 1989). Spender proposes that KM is about knowledge absence rather than knowledge assets.

Schulze and Leidner's Taxonomy

Schulze and Leidner (2002) use the concept of 'discourse' which has fluid boundaries and is not mutually exclusive (as opposed to 'paradigm,' which has sealed edges). They are wary of 'intellectual monism', meaning a restricted line of enquiry, which makes assumptions about what constitutes a good thing. They describe knowledge as a double-edged sword and consider the negative unintended consequences of managing organisational knowledge. Deetz's (1996) framework of four scientific discourses is adopted as a structure for enquiry: the normative, the interpretive, the critical and the dialogic, based on Burrell and Morgan's (1979) paradigms of social and organisational enquiry. Four discourses are plotted against polar axes which show (X) the origin of concepts and problems as local/emergent *versus elite/a priori*, and (Y) the relation to the dominant social discourse as dissensus *versus* consensus.

The X axis signifies a practitioner, action-based type of organisational knowledge at the local/emergent end, compared to the theoretical language and expertise of the research community at the *elite/a priori* end. The Y axis orients discourses according to whether they disrupt dominant structures of knowledge, social relations and identities through dissensus, or whether they cement and reproduce the dominant structures through consensus. "Thus consensus research assumes that organizational phenomena such as knowledge, culture, and identity are coherent and more or less unified, whereas dissensus research assumes that these phenomena are multiple, conflicting, and fragmented" (p216).

Figure 8. Schulze and Leidner's (2002) Four Discourses



The four discourses are: (1) Normative discourse sits within the positivist, enlightenment mode of enquiry, seeking generalisable and causal law-like findings, based on nomothetic methods, that can be codified and accumulated. (2) Interpretive discourse "emphasizes the social rather than the economic view of organisational activities (Deetz, 1996, p201)", (p217). Ethnographic and hermeneutic research methods approach people as sensemakers, dealing with contradiction and complexity in organisational life, where tradition may be stronger than systems. The consensus dynamic acknowledges conflict but aims for function rather than dysfunction, seeking harmony out of discord. (3) Critical discourse "is marked by a view of organizations as sites of political struggle and fields of continuous conflict". Cultural criticism methods are used to promote reformation of the social order by unmasking sources of power, domination and vested interests. (4) The dialogic, or postmodern, discourse focuses on "the constructed nature of reality and the role of language in this construction process" (p217). Life consists of disjointed narratives that never become coherent. "Thus a single reality remains elusive". It differs from critical discourse in its lack of *a priori* assumptions about the seat of power and domination, instead using deconstructionist and genealogic methods to trace complexity in situations.

5.1.2 Embedded

There is an 'inextricable linkage between tacit and explicit knowledge' (Alavi and Leidner, 2001, p112) since tacit is needed for interpretation of explicit knowledge. A further inextricability is the distinction between knowing and doing.

Brown and Duguid (1998) used communities of practice, rather than the individual, as the unit of analysis, in which 'know-how' as opposed to 'know-what' (Ryle, 1946) is embedded as a capability. Knowledge may be readily shared within the CoP but is 'sticky' or difficult to move between different communities. Knowledge management is a question of integrating and sharing knowledge that is embedded in work practices.

Orlikowski (2002) departs from the noun *knowledge*, "connoting things, elements, facts, processes, dispositions" (p251) in favour of the verb *knowing*, "connoting action, doing, practice" (p251), acknowledging the role of human agency. Knowing is performative, using Schön's (1983, p. 49) observation that "our knowing is *in* our action." She develops the conceptual framework by

assuming that “tacit knowledge is a form of ‘knowing’, and this inseparable from action because it is constituted through such action”. Playing chess and riding a bike are two examples of the inextricability of tacit knowledge, knowing how and action.

The mutual constitution of knowing and practice is illustrated by Escher’s (1948) lithograph *Drawing Hands* “where the right hand draws the left hand even as the left hand draws the right hand” (Orlikowski, 2002, p251).

Competence and capability are generated through action and reconstituted through different contexts, explored by Weick (1993, 1996) and Weick and Roberts (1993) in studies of airline accidents where firefighters and aircraft crew were unable to act competently in emergency settings.

The concept of embedded practice challenges the idea that ‘best practices’ can be transferred across boundaries. Knowledge or knowing as embedded practice is at odds with the notion of ‘transfer’ or even ‘best’.

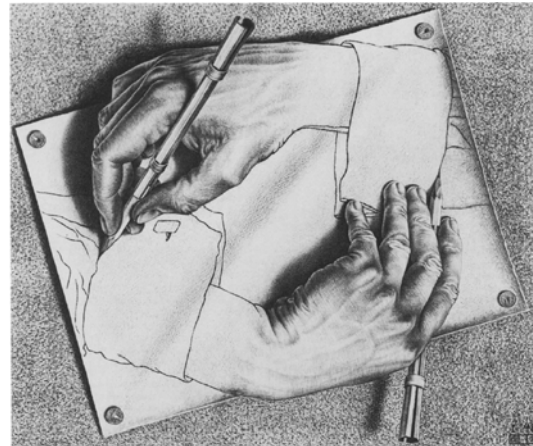


Figure 9. *Drawing Hands* (Source: Orlikowski, 2002, p251)

5.2 How do We Know What We Know?

This question of “how do we know what we know?” intersects with the previous question about the nature knowledge. The overlap demonstrates the importance of epistemology in this review of knowledge mobilisation. Do we learn as individuals, as a collective, or do we absorb by doing?

5.2.1 Because We Tell You

Gourlay (2006) argues that, in Nonaka’s world, “knowledge is created when managers decide something is knowledge for the organization,” for example, in determining viability of new production ideas (p1416). That suggests that we know what we know because it has entered the canon of ‘knowledge’.

Currie and Kerrin (2004) consider epistemology of possession and epistemology of practice (Cook and Brown, 1999) as a way of thinking about knowledge and knowing, noting that the link between knowledge and power is an important one (Alvesson, 1993; Foucault, 1977; MacKinlay, 2000, 2002; Willmott, 1995). Having knowledge and using it are two different things. Employees may hoard their knowledge to shore up their value to the company, retaining power.

5.2.2 Because We are Limited

Tsoukas and Vladimirou (2001) describe the CoP process: “through experience and their participation in a ‘community of practice’ (Brown and Duguid, 1991; Wenger, 1998), operators develop a set of diagnostic skills which over time become instrumentalized, that is to say, tacit” (p987). Nevertheless, they insist that tacit knowledge, even when acquired as part of a community, remains personal and therefore tacit at the level of the individual: “ ‘All knowing is

personal knowing – participation through indwelling’ (Polanyi, 1975, p. 44; emphasis in the original)” (p975).

Collins (2007), in his suggestively titled paper ‘Bicycling on the Moon’, deals with the ‘taken-for granted, the unspoken and the unspeakable’ (p257) nature of tacit knowledge. He points out that ‘the concept of tacit knowledge lives rich, varied and, to some extent, independent lives in different academic worlds” (p257). He makes a distinction between the physiological and cognitive limits of humans set by their brains and bodies (somatic), and the ‘ontological’ or collective knowledge that exists in a social space. Polanyi (1958) famously used the example of knowing how to ride a bike as an example of tacit knowledge. Explicit rules are useless, not because bike-riding cannot be formalised or articulated, but because the rules are no help. “Most humans can demonstrate their knowledge of bike-riding only by bike-riding” (Collins, p258). Nevertheless, Collins argues, the rules could be useful to a physicist in building a robotic bike-rider. Somatic-tacit knowledge is limited by human biological limitations, rather than by the nature of knowledge itself. It is a learning problem that does not preclude use of Artificial Intelligence, based on encoded routines. To put a robotic bike-rider in traffic, on the other hand, requires a degree of improvisation based on social and collective expectations of behaviour. The two types of knowledge are confounded, according to Collins, because they are absorbed by humans in the same way, but they have different consequences: machines can reproduce somatic-limit tacit knowledge but collective tacit knowledge is irreproducible and may be navigated only by humans.

5.2.3 Because They Create It

Social Construction of Reality (Berger and Luckmann, 1966) emphasises the role of environment and perspective in knowing what we know. It views knowledge as ‘iterative or circular rather than linear’ (Parent *et al*, p84). People interpret reality from the vantage point of their own context and experience and act on that basis, thus constructing a reality out of their everyday interaction, so that “as each of us interprets, uses and re-uses knowledge, we are also creating new knowledge” (Parent *et al*, p84).

Learning new ways through adoption and utilisation of new knowledge involves unlearning of old ways. The disruption to equilibrium means that knowledge transfer may mean “adaptation of the existing knowledge to the specific context” (Foss and Pederson, 2002, p54).

Social constructionism (Gergen, 1985; 1999) postulates that the world people create, via a process of social exchange, constitutes a reality. It puts emphasis upon the social dimension of knowledge (Schwandt, 2000).

5.2.4 Because We Make Sense

Weick (1979) argues that people need help to make sense of and resolve complex problems. ‘Equivocality’ and ‘ambiguity’ describe the state of confusion and uncertainty that besets people when confronted with complex and unfamiliar situations. ‘Sensemaking’ describes the action involved in reducing equivocality and managing ambiguity. Organisations need to exist precisely to introduce processes that deal with these problems.

Williams (2001) describes Weick’s (1995) seven properties of sensemaking: “it is grounded in identity construction (our self-concept develops from social interactions and serves to maintain a positive image of oneself); it focuses on

things which have happened in the past; it enacts the environment (what you see is your construction of the environment not the environment itself); it is a social phenomenon in that what you see is dependent upon sharing meanings with others; it is an ongoing activity, and interruptions can arouse positive or negative emotions depending on whether they are seen as helpful or not; it focuses on and is influenced by extracted cues (i.e., we generalize from selected cues and within a frame of reference); it is driven by plausibility rather than accuracy (speed in sensemaking is brought about by focusing on minimal cues, and embellishing from these minimal cues; themes of accuracy rarely dominate discussions of sensemaking, but beliefs which facilitate ongoing tasks are treated as accurate since it is the consequences of action which are most believable)." (p 77)

5.2.5 Because We Like Stories

Narratives deal with the vicissitudes of human intentions (Bruner, 1986 in Patriotta, 2003) and access the 'buzzing, pulsating, formless mass of signals, out of which people try to make sense, into which they attempt to introduce order, and from which they construct against a background that remains undifferentiated' (James, 1950, cited in Czarniawska, 1998, and Patriotta, 2003, p352).

Narrative as an epistemological form is seen as central to communities of practice, acting as carriers of tacit knowledge, e.g. when technicians "talk about machines" in Orr's (1990) ethnographic study photocopier reps (discussed in Patriotta, 2003). Narrative devices such as detective stories act as diagnostic tools and repositories of knowledge (Ginsberg, 1990). Interest in narrative as a qualitative, as opposed to quantitative, form of knowledge is based on interpretive reasoning. Logico-scientific- deductive reasoning is polarised in debate against narrative-inductive approaches.

5.3 What is Organisational Knowledge & Knowing?

Knowledge is a source of value and a resource tied up with employees of an organisation, so that the Resource Based View of the firm underpins the concept of organisational knowledge, even as a model to be critiqued (e.g. by critical theorists such as Alavi & Leidner).

5.3.1 Rules and Processes

"Organizational knowledge is much talked about but little understood", according to Tsoukas and Vladimirou (2001) who address this question by exploring "the links between individual knowledge, organizational knowledge, and human action undertaken in organized contexts" (p973).

They summarise personal knowledge as "the individual capability to draw distinctions, within a domain of action, based on an appreciation of context or theory, or both" (p976). They define organisational knowledge as "capability members of an organization have developed to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalizations whose application depends on historically evolved collective understandings" (p976). This is set within the context that "organizations can be seen as collections of knowledge assets".

Rules and processes are the key to converting personal knowledge into organisational knowledge. Personal becomes organisational through application

of rules that have been generated by a previous body of knowledge: "knowledge becomes organizational when, as well as drawing distinctions in the course of their work by taking into account the contextuality of their actions, *individuals draw and act upon a corpus of generalizations in the form of generic rules produced by the organization.*" (p979). Interpretation and judgement are required in selecting and applying rules, since "members of a community must share in interpretation as to what a rule means before they apply it" (p980).

5.3.2 Justified Belief

There is a tension between the collective and emergent understanding of organisational knowledge and the imposition of knowledge by managers. Gourlay (2006) describes organisational knowledge, interpreting Nonaka's (1994) theory, as 'justified belief' which is in effect created by managers (Gourlay, 2006, p 1416).

5.3.3 Source of Power and Oppression

Critical theory, from Marxist roots (Lehr & Rice, 2002), aims to reveal systems of domination and oppression and is concerned with the problem of knowledge as power, located with workers and with managers. Knowledge management becomes a method of behavioural control.

The dominant view of power (Doolin, 2004) represents a balance in which the powerful denies, represses or coerces the powerless (Lukes, 1974; Clegg, 1989; Bloomfield & Coombs, 1992) and can be redistributed through shifts of resources. This treatment of power is evident in early studies (e.g. Pettigrew, 1972; Bariff & Galbraith, 1978; Markus, 1981), and current works in the IT field (e.g. Pfeffer, 1994; Gray, 2001; Jasperson *et al*, 2002). The view is criticised as lacking a relational dimension (Clegg, 1989) where power "exists only when it is exercised, when it is put into action" (p345).

Foucauld (1977; 1980; 1982) provides a relational conception of power in which it is "exercised from within the social body rather than above it" (Doolin, 2004, p345). He used Bentham's Panoptican elevated central watchtower design in prisons and psychiatric institutions as a metaphor for surveillance and control. Its all-knowing, all-seeing presence, continuous and anonymous, instils a new internalised discipline in the watched, in which that person is self-monitoring and becomes the guardian of his or her own normative behaviour (Clegg, 1989; discussed in Doolin, 2004).

'Calculability' of individuals is enhanced by devices which allow evaluation and calculation of the extent to which they deviate from the reference of the norm. Information technology increases calculability by comparing performance and rationalising behaviour. To be calculable is to be knowable and governable. It is not to be inevitably passive or a victim, however, since people will try to divert the rules imposed on them (Clegg, 1989; Covalski *et al*, 1993). "Disciplinary technologies such as comparative surveillance information systems are not exclusively constraining. Indeed, such systems are 'double-edged', in that they also empower by providing a legitimate space for action (Bloomfield & Coombs, 1992).

5.3.4 Image and Rhetoric

Alvesson (2001) is sceptical and suspicious when he talks about the "slipperiness of the concept of knowledge" in the context of "so-called knowledge intensive

companies" (p863). He prefers the moniker of 'ambiguity-intensive' organisations and draws a link between knowledge, knowledge work, management of employees and ultimately their identity. "Knowledge-intensive signifies an intensity of rhetoric, image, interaction and identity-regulation" (p883). He defines knowledge-intensive companies (Alvesson, 1995; Alvesson, 1993; Robertson & Swan, 1998; Starbuck, 1992) as "firms where most work is said to be of an intellectual nature and where well-educated, qualified employees form the major part of the work force." Law, accounting and consultancy are typical examples. He concludes that knowledge and knowledge work is ambiguous and difficult to substantiate, and that "perhaps *the claim to knowledge-intensiveness* is one of the most distinguishing features". On that basis, "management of rhetoric, image and social processes appear crucial", conveyed through terms such as 'interpretation', 'beliefs' 'expectations', 'symbolism', 'impression', (p865), 'persuasion' (p882). (The notion of image was picked up by Empson (2001) where perceptions of 'hairy arsed guys' (p856) who lacked an upmarket image acted as barriers to mergers of KIFs). The very ambiguity of knowledge lends itself to manipulation and creation of image to sell the package, grooming a self-identity for the employees.

5.3.5 Dispersed and Ambiguous

Becker (2001) addresses the question of ambiguity and links it to organisational form. He focuses on the dispersed nature of knowledge, arguing that tacit knowledge has received a lot of attention but dispersed knowledge has been neglected. Division of labour equates to division of knowledge. Problems emerge because dispersion is associated with 'large numbers, asymmetries and uncertainty'. Managers struggle to get an overview of knowledge when it is fragmented among a large numbers of workers, and uncertainty makes it difficult to make informed decisions. Asymmetry means that some people are more competent than others, either because they are quicker to learn or their job allows for more learning by doing. Becker proposes four strategies for getting over these problems:

- Substitute knowledge by access to knowledge, e.g. use of IS/IT to create information channels;
- Recreate missing components, by giving people the skills to detect and fill gaps in their knowledge;
- Create co-ordinating mechanisms through institutional design, e.g. through use of networks or, classically, through price/market and hierarchy/authority. (Adler, 2001, addresses this angle);
- Create more information through 'decomposition', or cutting information into bite-sized chunks. This would produce a tension with the 'large numbers' effect;
- Increase information availability as a means of reducing uncertainty.

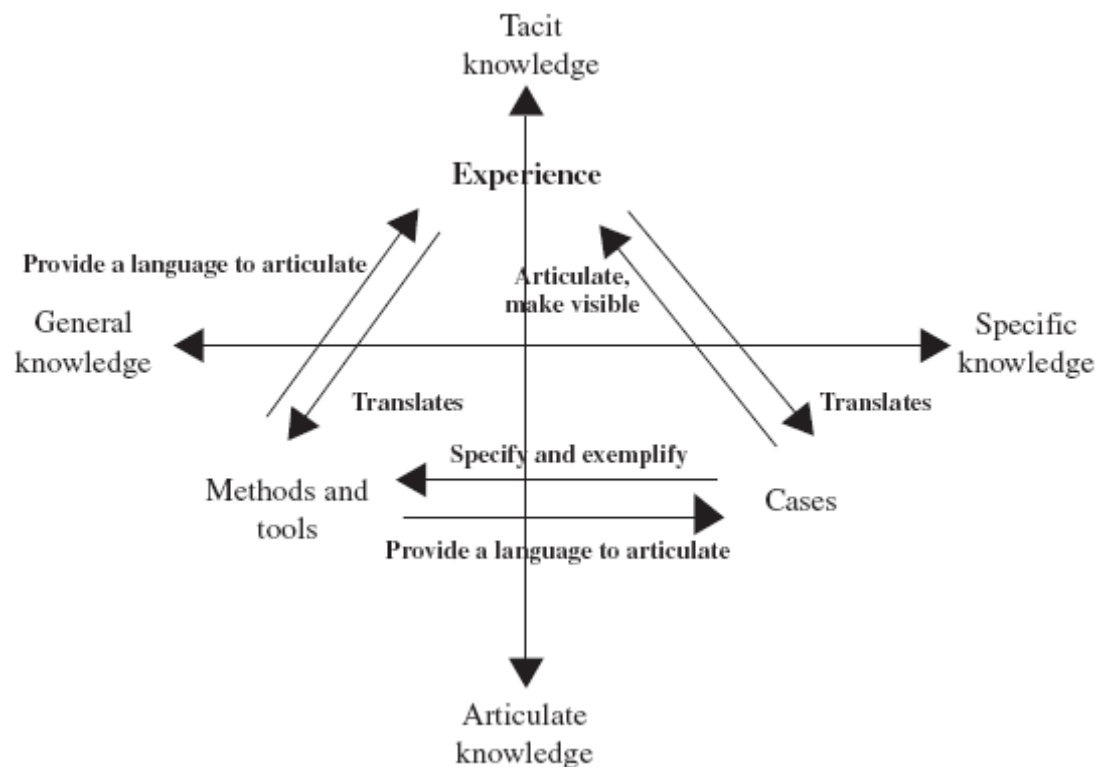
Becker argues that the effectiveness of virtual organisations is dependent on solving these problems. If it is not possible to address them then the implication might be that co-location, face to face communication and communities of practice are more promising ways of functioning. Dispersed nature of knowledge becomes a problem of organisational form.

5.3.6 Organisational Competence

Werr and Stjernberg (2003) conducted a (more positivistic) study of management consultancy firms. They set out three basic elements of a knowledge system (experience, methods/tools and cases) and their interrelations, along the dimensions of tacit-articulate knowledge and general – specific knowledge. Each

knowledge element contributes to the overall system “by leveraging the value of the other knowledge elements” (p895). They suggest that the common language shared within consultancy companies will vary according to the type of service they provide, e.g. whether standardised or creative. This is supported by Robertson, Scarbrough *et al* (2003) who showed that science-based consultants value experimentation and accumulation of knowledge, while law-based consultants value interpretation.

Figure 10. Knowledge System in Management Consultancy (Source: Werr and Stjernberg, 2003)



5.3.7 Action and Possibility

Hargadon & Fanelli (2002) construct a duality around “empirical” and “latent” perspectives on knowledge where “empirical” means action-oriented and “latent” refers to the “individually held schemata of organisational members”, representing the capacity or possibility for constructing novel actions. Action produces organisational processes of acquisition, diffusion and replication. Empirical knowledge “encompasses the physical and social artifacts that surround individuals in organizations” and includes technology, databases and processes. It is used to generate individually-held schemata.

These definitions highlight the interdependence of the two knowledge types. Hargadon & Fanelli resort to structuration theory, based on Giddens’ (1979, 1987) argument that structure and action are ongoing and recursive rather than polarised: “every process of action is the production of something new, a fresh act, but at the same time all action exists in continuity with the past, which supplies the means of its initiation” (Giddens 1979, pp. 69-70, quoted on p291).

Table 3. Comparing Innovation & Learning Perspectives of Knowledge
(Source: Hargadon & Fanelli, 2002)

	Innovation perspective	Learning perspective
Dominant research questions	Which factors explain the innovative capabilities of individuals and organizations? How does innovation unfold over time?	Which factors explain the modification of the available behavioral alternatives? How is knowledge acquired, distributed, interpreted, and stored?
Assumptions	Innovation is the creation and exploitation of new ideas from the preexisting characteristics and knowledge of the innovator.	Learning is the acquisition and retention of existing knowledge through experience with the external environment.
Implicit quality of knowledge	Knowledge is a latent construct, representing the potential for generating novel actions.	Knowledge is an empirical construct, representing the potential for acquiring and replicating existing actions.
Central process considered	The conversion of latent knowledge, comprising locally held but socially derived scripts, goals, identities of individuals, into empirical knowledge, the resulting physical and social artifacts of action	The conversion of empirical knowledge, derived from experiences with the physical and social artifacts of the environment, into latent knowledge, the scripts, goals, identities that make future, novel action possible

The authors focus on two dominant research models: innovation and organisational learning. Innovation is about creation and exploitation of new ideas (Kanter, 1988, p170) and therefore ‘represents the conversions of what an organisation knows how to do into actions it has never done before’ (p292) whereas organisational learning involves “the processes that convert an organization’s experience (its actions) into possibilities for future action (what it knows how to do)” (p292). They argue that it is expensive for an organisation to adopt one or other perspective and that the “dynamic reciprocal relationship that exists between learning and innovation” is more productive.

5.3.8 A Process of Learning

The organisational learning approach characterises the organisation as more than a sum of individuals, but as something that may mature or develop under specific conditions. It marks a process of change, adaptation and improvement to remain viable; (Argote, 1999; Argyris & Schön, 1996; Huber, 1991; Kim, 1990; Levitt & March, 1995; Locke & Jain, 1995; March, 1991, 1999; Senge, 1990; Simon, 1991; Stata, 1989; discussed in Lehr & Rice, 2002). The OL approach highlights the importance of distributing and organising knowledge for re-use later.

5.3.9 An Integrative Framework

Earlier questions about nature of knowledge and knowing highlighted taxonomies, i.e. lists of categories that different theorists had proposed, or detailed explanations, e.g. communities of practice. A few authors have tried to draw together an integrative framework. They tend to appear in journals for information science and technology where there is a conscientious effort to systematise the whole field.

Hosapple and Joshi (2004) used a systematic Delphi process among 30 KM practitioners and researchers to develop an ‘ontology’, intended for application among KM practitioners, educators and researchers. It links conduct, activities, resources and influences through nearly one hundred definitions and axioms which aim to (a) unify KM concepts, (b) be comprehensive and (c) be useful.

Table 4. Applying the KM ontology to summarize exemplars of KM best practices (Hosapple and Joshi, 2004, p609)

Aspects of KM conduct	KM Best Practices			
	Chaparral Steel	Dow Chemicals	Skandia Inc.	Buckman Labs
Influences				
Managerial	Developed reward and incentive systems that encourage knowledge building	Created ways of measuring knowledge assets	Created ways of measuring and accounting for knowledge assets	Use of incentives and technology for effective coordination of knowledge manipulation activities
Resource	Creating culture conducive for knowledge building			
Activities	Instilling knowledge building activities into manufacturing processes			
Resources		Developed methods for extracting value from knowledge assets	Developed methods for accessing knowledge assets	

Jashapara (2005) has also developed an integrative framework for knowledge management, schematised below.

Figure 11. An integrative framework of knowledge management (Jashapara 2005, p141)



5.4 Why do These Questions Matter?

Knowledge has gained ground as an object of interest due to “increasing digitization of social and economic life, the widespread use of information and communication technologies, a more literate workforce, the increasing dependence of advanced economies on services, the expansion of a professional and technical class, and several other factors, all of which have made economic activities and transactions depend on specialized, or ‘theoretical’ knowledge” (Tsoukas & Mylonopoulos, 2004, pS1). Conceptions of knowledge have methodological and empirical consequences.

5.4.1 Link between Methodology and Epistemology

Charreire Petit and Huault (2008) highlight the link between methodology and conceptions of knowledge and epistemological foundations. The reaction against positivism that we have observed in the literature, which has emphasised knowledge complexity, context-based nature and its socially constructed character, is held up to scrutiny to see whether there really is a 'paradigm shift' at work. To undertake a close analysis they focus on constructivism, which is similar to social-constructivism, but with emphasis upon a cognitive and psychological rather than a social dimension (Schwandt, 1994; 2000). The authors look at articles that consider 'how is organisational knowledge constructed?' and argue for the 'the need to link methods to epistemology', as indicated below.

Table 5. Organisational Knowledge Construction (Source: Charreire Petit and Huault, 2008)

Issue	Positivism and post-positivism	Constructivism
Conception of knowledge	Knowledge as a structure or concrete process	Knowledge as social construction and meaning-making process
The knowledge's priority metaphor	Knowledge as a stock	Knowledge as a flow
Conception of researcher's role	Exteriorized position (speaking from the outside). Limitation of contamination biases, distancing from methodological tools	Commitment to the system under study (speaking from the inside) Reflexivity regarding the status of the tools and of the researcher
Epistemological foundations	Reaching the truth	To obtain phenomenological insight, revelation. Assimilating the meanings and the interpretations of the context
Methods and instrumentations	Surveys Triangulations Experimentations	Action research (change to know) Ethnography Storytelling Language, action and interaction as priority modes for the creation of knowledge
Criteria of scientificity	Internal validity Consistency External validity	Appropriateness Training

5.4.2 Converting Tacit to Explicit – Empirical use of Knowledge Exchange Protocols

Herschel *et al* (2001) address the distinction between tacit and explicit knowledge. In the context of health care they have proposed a method for converting the doctor's tacit knowledge into explicit knowledge for the benefit of the patients, by means of a knowledge exchange protocol. They note that this will be useful to Chief Knowledge Officers, (presupposing a capacity and structure that does not necessarily exist in the UK). This situation-oriented, physician/patient (SOAP) protocol provides a framework for:

- structuring clinician-patient narratives
- understanding the clinician's thinking about perceived problems and issues

- learning about techniques and tests employed by the clinician in the knowledge creation process
- sharing the clinician's reasons for actions taken to address patient issues

The framework combines sense-making with knowledge creation (closing the gaps in understanding) and decision-making through choice of actions. The authors tested their use as a vehicle for converting tacit to explicit knowledge, and found that the SOAP itself was less important than the way in which doctors were asked to recall the information. In other words, it was the method of enquiry rather than the tool itself that mattered: "structuring information (in this case, a rich narrative) may not be as essential to the expressed understanding of that information as to the nature of the recall format". It was not what the authors expected.

Box 9. Herschel *et al* (2001) – Example of Exchange Protocol

Jim, Slim	111-2222	3/22/77
Subjective: (a brief narrative of the patient's expressed complaints)	Recent onset of fever, diffuse aches, sore throat, clear rhinorrhea, and non-productive cough	
Objective: (a description of the specific activities used to better learn the true nature of the patient's situation)	GEN: I11 appearing HEENT: Inflamed pharynx, TM's normal, PERLA, conjunctiva WNL, nasal congestion NECK: Tender anterior cervical adenopathy LUNGS: Clear to auscultation, equal BS HEART: RR & R, no murmur, gallop, or rub, not enlarged ABD: Soft BJE: Mild diffuse muscle tenderness NEURO: Alert, no meningeal signs SKIN: No rashes or lesions	
Assessment: (A decision about what is wrong with the patient)	Influenza #487.1.	
Plan: (a prescribed course of action for the patient to alleviate the problem(s))	Tylenol, bedrest, and fluids until fever free and feeling improvement in symptoms for 24-48 hours (Typically persons with influenza are ill for one week)	

The message for organisations such as the NHS is that there is no magic tool. The authors declare that the good news is that richness of narrative content may be more important than structure. At the same time, protocols can act as a form of structured recall and are therefore helpful in converting tacit to explicit knowledge. It is essentially supportive of the use of narrative (and so free text) in medical records.

5.4.3 Epistemology for Health

Lehaney *et al* (2004) reviews 40 frameworks in published knowledge management research and places them into three taxonomies. (1) Data-information-knowledge hierarchies gave way to (2) recognition of different knowledge types (e.g. Alavi and Leidner, 2001); (3) Blackler (1995) used embodied, embedded, embrained, encultured distinctions (which were adapted by Lam, 2000). Sheffield (2008) maps these knowledge management perspectives to philosophical assumptions that are described as (a) technical, positivist and

objective; (b) practical, interpretivist, social (norms) or (c) emancipatory, critical pluralist or personal (values). He suggests that the framework is useful as a way of integrating value laden aspects of clinical practice (knowledge creation) with process flows (knowledge normalisation) and technical use of information systems (knowledge application).

5.5 Exemplar Papers

5.5.1 Most Cited Paper – Contribution to Theory

Box 10. Abstract from Haridimos Tsoukas, E. Vladimirou (2001)

Abstract: Organizational knowledge is much talked about but little understood. In this paper we set out to conceptualize organizational knowledge and explore its implications for knowledge management. We take on board Polanyi's insight concerning the personal character of knowledge and fuse it with Wittgenstein's insight that all knowledge is, in a fundamental way, collective. We do this in order to show, on the one hand, how individuals appropriate knowledge and expand their knowledge repertoires, and, on the other hand, how knowledge, in organized contexts, becomes organizational. Our claim is that knowledge is the individual capability to draw distinctions, within a domain of action, based on an appreciation of context or theory, or both. Organizational knowledge is the capability members of an organization have developed to draw distinctions in the process of carrying out their work, in particular concrete contexts, by enacting sets of generalizations whose application depends on historically evolved collective understandings. Following our theoretical exploration of organizational knowledge, we report the findings of a case study carried out at a call centre in Panafon, in Greece. Finally, we explore the implications of our argument by focusing on the links between knowledge and action on the one hand, and the management of organizational knowledge on the other. We argue that practical mastery needs to be supplemented by a quasi-theoretical understanding of what individuals are doing when they exercise that mastery, and this is what knowledge management should be aiming at. Knowledge management, we suggest, is the dynamic process of turning an unreflective practice into a reflective one by elucidating the rules guiding the activities of the practice, by helping give a particular shape to collective understandings, and by facilitating the emergence of heuristic knowledge.

Tsoukas and Vladimirou (2001)'s theoretical overview of the literature makes an important connection between knowledge and organization. People learn in communities of practice, communities of practice have shared rules and, through their application, the organisation becomes a set of rules, leading to an abstract notion of 'organisation-as-theory'. The collective sense of meaning confers norms, so that organisation-as-theory becomes organisation-as-network in which organisation is conceived as "a densely connected network of communication through which shared understandings are achieved" (p 981).

In the study of the Customer Care Department at Panafon, help-desk operators used intuition and uncoded learned knowledge to answer customer queries. Tsoukas and Vladimirou observed that individuals do not understand generalised rules or codified knowledge until they are able to test them against personal experience; they "comprehend the general by relating it to the particular they are confronted with". The consequence for organisations is that, to manage this aspect of organisational knowledge, "a company must strive to sustain a spirit of community at work, to encourage employees to improvise and undertake

initiatives of their own, as well as actively maintain a sense of corporate mission” (p991).

5.5.2 Interesting Paper – Methodological Debate

Box 11. Abstract from Tranfield, Denyer and Smart (2003)

Abstract: Undertaking a review of the literature is an important part of any research project. The researcher both maps and assesses the relevant intellectual territory in order to specify a research question which will further develop the knowledge base. However, traditional ‘narrative’ reviews frequently lack thoroughness, and in many cases are not undertaken as genuine pieces of investigatory science. Consequently they can lack a means for making sense of what the collection of studies is saying. These reviews can be biased by the researcher and often lack rigour. Furthermore, the use of reviews of the available evidence to provide insights and guidance for intervention into operational needs of practitioners and policymakers has largely been of secondary importance. For practitioners, making sense of a mass of often-contradictory evidence has become progressively harder. The quality of evidence underpinning decision-making and action has been questioned, for inadequate or incomplete evidence seriously impedes policy formulation and implementation. In exploring ways in which evidence-informed management reviews might be achieved, the authors evaluate the process of systematic review used in the medical sciences. Over the last fifteen years, medical science has attempted to improve the review process by synthesizing research in a systematic, transparent, and reproducible manner with the twin aims of enhancing the knowledge base and informing policymaking and practice. This paper evaluates the extent to which the process of systematic review can be applied to the management field in order to produce a reliable knowledge stock and enhanced practice by developing context-sensitive research. The paper highlights the challenges in developing an appropriate methodology.

Tranfield, Denyer and Smart (2003), dealing with health-related subject matter but published in generic management literature, polarise the approaches of narrative and systematic methods of acquiring knowledge in the form of literature reviews. They argue that narrative reviews lack rigour and that the systematic approach applied in biomedical sciences offers a more comprehensive and therefore valid methodology. The question ‘how do we know what we know?’ becomes a methodological question.

The debate between hard and soft dimensions of management knowledge was stimulated by Tranfield and Starkey (1998) who argued that a hierarchy of management evidence was possible, in spite of ambiguous and diffuse notions of context, stakeholder perspectives, contestability and challenges to authority.

In spite of the explicit distinctions between medical and management knowledge bases, Tranfield *et al* conclude that systematic reviews are the underpinning of ‘pragmatic’ research, aiming to be both relevant and rigorous (Hodgkinson and Herriot, 2001). They put a marker in the sand against which any evidence review can test itself. In effect, Evidence Based (or Informed or Aware) Management is exhorted to learn from Evidence Based Medicine.

Table 6. Differences between medical research and management research Source: Tranfield, Denyer and Smart, 2003)

	Medicine	Management
<i>Nature of the discipline</i>	Convergent	Divergent.
Research culture	Subjected to rigorous scientific evaluation.	Split between positivist and phenomenological perspectives.
Research questions	High consensus over research questions.	Low consensus over research questions.
Interventions	Can be measured through experiments.	Experimentation may or may not be feasible.
Research designs	Based upon a hierarchy of evidence.	Triangulation is recommended.
Theory	Concerned with what works—did the intervention offer overall benefits.	Concerned with why something works or does not work and the context in which this occurs.
Aims of policy	Generally reducing illness and death, and improving health.	Multiple and competing and the balance between them may change over time.
Weight of inputs into policy	Scientific evidence.	Many extraneous factors.
Methods	Predominantly quantitative.	Quantitative and qualitative.
Literature reviews	Systematic review and meta-analysis.	Largely narrative reviews.
The need for a review	Reviews of effectiveness are used by clinical practitioners.	To develop a research question and inform empirical research practice.
Preparation of the review	A review panel (including practitioners) guides the process. A brief scoping study is conducted to delimit the subject area.	Usually an informal/ad hoc process involving the researcher, peers and supervisor.
Review protocol	A plan prior to the review states the criterion for including and excluding studies, the search strategy, description of the methods to be used, coding strategies and the statistical procedures to be employed. Protocols are made available by international bodies to enhance networking the exchange of knowledge.	Level of formality and standardisation in designing/adopting protocols is usually low. Unacceptable to 'tightly' plan literature review, as this may inhibit the researchers capacity to explore, discover and develop ideas.
Identifying research	A comprehensive, structured search is conducted using predetermined keywords and search strings.	Identifying a field/sub- fields of study generally occurs through informal consultation. Implicit idiosyncratic methods of data collection are used.
Selection of studies	Inclusion and exclusion criteria are expressed in the protocol to ensure a review of the best available evidence. Draw upon 'raw data' from 'whole studies' for analysis to create a study in its own right.	Based on studies that appear relevant or interesting. Researchers bias disables critical appraisal. Decisions regarding choice are not recorded precluding any audit trails 'Raw data' is often not available in academic articles, which usually represent 'partial studies'. Precise inclusion/exclusion criteria are often not formally agreed, applied recorded or monitored.
Study quality assessment	Studies are assessed against predetermined criteria. The internal validity of the study is judged Assessing and including qualitative studies is problematic.	Poor evaluating of the fit between research methodology and research questions. Researchers tend to rely on the quality rating of a particular journal, rather than applying quality assessment criteria to individual articles.
Data extraction	Data extraction forms are used which act as a historical record for the decisions made during the process and provides the basis on which to conduct data synthesis.	Data extraction is not formally guided by explicitly stated inclusion and exclusion criteria. Data extracted is not comprehensively recorded and monitored.
Data synthesis	A qualitative synthesis provides a tabulation of key characteristics and results. Meta-analysis pools the data across studies to increase the power of statistical analysis. Aims to generate 'best' evidence.	Generally narrative and qualitative. Higher levels of subjectivity associated with what is taken from an article for analysis and synthesis. Lack explicit descriptive and thematic analysis. Specific tools and techniques from the field of qualitative data analysis are increasingly applied.
Reporting and Dissemination	Standardized reporting structures used Non-explanatory style adopted. Short scripts recorded and made widely avail able through internationally recognized institutions. Comprehensible by practitioners.	Non-standardized reporting structures. Interpretive long scripts. The explanatory power improved through the use of analogy, metaphor and homology. Process of knowledge production, omitted. Sometimes incomprehensible by practitioners lack links between different literature.
Evidence into practice	Collaborative process and practice-oriented.	Implementation of evidence is often an afterthought.

6. Information Systems & Technology (Phase 1 Management Literature)

The papers assigned to this domain of Information Systems and Information Technology (IS/IT) tend to be of two types: either highly empirical, surveying or testing out technical solutions, or they take a philosophical overview of knowledge and consider how IS/IT might best accommodate these perspectives.

IS/IT is the traditional domain of knowledge management and Easterby-Smith (2000) notes that 70% of publications on knowledge management up to the year 2000 had been written by information technology specialists focusing on technical details such as database design. He noted that the debate was changing towards an interest in the human-dimension, since social factors were impairing IS/IT implementation.

Among the journals dedicated to IS/IT, e.g. 'Journal of the American Society for Information, Science and Technology' 'Administrative Science Quarterly' and 'Journal of Information Science' and 'Information Systems Journal', the papers cover the gamut of subject domains in our scoping review. This section deals with papers that focus on the role of IS/IT itself.

6.1 What Trends Are Emerging?

There is a trajectory of questions starting with 'what knowledge?' at the beginning of the review period (Alavi and Leidner, 2001) towards 'what performance?' near the end (Hansen and Haas, 2007). The pros and cons of codified knowledge *versus* personalised or interactive information, (in spite of a prejudice among scholars in favour of the latter), become a matter of weighing the costs and benefits of each. Organisations are invited to be selective about use of IS/IT solutions to get a match between knowledge and performance.

We need to be mindful of the optimism-bias in this field noted by Schulze and Leidner (2002). It is robustly challenged in the critical theory domain where a high proportion of papers are concerned with adverse consequences or undesirability of IS/IT, arguing that more research is needed on the power and cultural dimensions.

6.1.1 What Knowledge for IS/IT?

Alavi and Leidner (2001) provide a comprehensive sweep of literature in an effort to link IS/IT to knowledge types. They argue that different views of knowledge are relevant to how an organisation would choose to manage it. If it is a process then the flows of creation, sharing and distribution are important. If it is an object that needs to be accessed, then KM would seek to build stocks of knowledge. The 'inextricable linkage of tacit and explicit knowledge' (p112), in which tacit is needed for interpretation of explicit, can be assisted by IS/IT. For two people to understand each other their knowledge bases need to overlap. IS/IT has a role here, in expanding the possibility of shared knowledge by increasing 'weak ties' between people and creating informal links.

They note a divergence between scholars and decision makers. Scholars are observed to value tacit more highly than explicit knowledge. The greater ease of

recording hard information, however, means that decision-makers will be likely to favour explicit knowledge, giving it greater legitimacy in organisations. Adler (2001) flies the flag for explicit knowledge by acknowledging that it is less costly to transfer than tacit knowledge and plays an important role in economic growth of organisations.

Table 7. Taxonomy of Knowledge Perspectives (Source: Alavi and Leidner, 2001)

Perspectives		Implications for Knowledge Management (KM)	Implications for Knowledge Management Systems (KMS)
Knowledge vis-à-vis data and information	Data is facts, raw numbers. Information is processed/interpreted data. Knowledge is personalized information.	KM focuses on exposing individuals to potentially useful information and facilitating assimilation of information	KMS will not appear radically different from existing IS, but will be extended toward helping in user assimilation of information
State of mind	Knowledge is the state of knowing and understanding.	KM involves enhancing individual's learning and understanding through provision of information	Role of IT is to provide access to sources of knowledge rather than knowledge itself
Object	Knowledge is an object to be stored and manipulated.	Key KM issue is building and managing knowledge stocks	Role of IT involves gathering, storing, and transferring knowledge
Process	Knowledge is a process of applying expertise.	KM focus is on knowledge flows and the process of creation, sharing, and distributing knowledge	Role of IT is to provide link among sources of knowledge to create wider breadth and depth of knowledge flows
Access to information	Knowledge is a condition of access to information.	KM focus is organized access to and retrieval of content	Role of IT is to provide effective search and retrieval mechanisms for locating relevant information
Capability	Knowledge is the potential to influence action.	KM is about building core competencies and understanding strategic know-how	Role of IT is to enhance intellectual capital by supporting development of individual and organizational competencies

Schultze and Leidner (2001) explore in detail the question of 'what knowledge?' in a systematic review of six academic IS journals using keywords: knowledge, knowledge management, organizational learning, learning organization(s) and memory. 94 articles qualified for inclusion based on the criteria of being related to generation, organisation/storage, transfer and application of organisational knowledge. They were whittled down to 78 by excluding editorials, descriptive studies and reviews. The authors each classified the articles independently, using Deetz's (1996) primary classification dimensions of elite/local and consensus/dissensus. They finished with 2 dialogic, 1 critical, 19 interpretive and 53 normative.

Papers in the normative discourse include taxonomies of knowledge and a focus on problem-solving. The underlying metaphor is of knowledge as an object that can be operationalised, stored and transferred. It is characterised as a stock that

exists outside the individual. Various theories sit within the discourse, including innovation diffusion (Rai, 1995), absorptive capacity (Agarwal *et al*, 1997; Boyton *et al*, 1994), managerial cognition (Dhaliwal and Benbasat, 1996; Hine and Goul, 1998; Merali, 2000). Traditional IS research themes, such as system design and communication, remain in evidence, but couched within knowledge management vocabulary.

Papers in the interpretive discourse treat knowledge as socially constructed and implicit in organisational practices. Knowledge is not generally studied directly, but rather through its role in transformation (Robey and Sahay, 1996). Situated work and organisational practices (Brown, 1998), including communities of practice (based on Lave and Wenger, 1991) and organisational learning (Henfridsson and Soderholm, 2000; Pentland, 1995) fall within this discourse. The underlying metaphor representing knowledge as practice and knowledge as culture is described as 'organizational mind' (Weick and Roberts, 1993), meaning 'to heed' or 'to mind' in the face of distributed cognition (Boland *et al*, 1994) and lack of shared meaning. Research in this tradition does not provide specific IT guidelines but tends to focus on the unintended consequences of technology that reinforces pre-existing routines and makes for rigidity.

One paper (Elkjaer *et al*, 1991) represented critical discourse, looking at power relations that institutionalise organisational structures, based on labour process theory and the work of Foucault (1979). Knowledge is conceived through the metaphor of 'commodity', posing as a neutral object, but in reality being part of a political economy and manipulated by interests such as consultants. The implication for IS research is that IS professionals and methodologies are not neutral. Action research offers a medium for effecting change.

Dialogic discourse is a minority category (only 2 out of 78 papers) – perhaps not surprising since IS as a domain is generally about solving problems and dialogic discourse is defined around its lack of convergence. The papers addressed organisational learning and forgetting (Bowker, 1997) and dynamics of control related to technology (Orlikowski, 1991)

The authors conclude that IS literature is biased towards consensus discourses and the normative discourse in particular, with "tendencies to adopt an optimistic view" of knowledge and its management. Negative impacts of knowledge are largely neglected in the literature, e.g. whether behaviour is systematised leading to loss of autonomy.

6.1.2 What IS/IT for Knowledge?

In asking 'what IS/IT is needed for what knowledge?' the answer seems to be "good quality" and "not too much". Knowledge management systems (KMS) are defined as "IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer, and application" (Alavi & Leidner, 2001, p114). Common applications include: (1) the coding and sharing of best practices, e.g. benchmarks; (2) the creation of corporate knowledge directories, or "mapping of internal expertise"; and (3) the creation of knowledge networks, e.g. online forums in specialist areas.

KMSs may be divided into two categories: the personalised and the codified (Hansen, Nohria, & Tierney, 1999). Technologies that support the personalised approach include knowledge directories (e.g., yellow pages) and knowledge networks (e.g., electronic communities of practice). Technologies that support the codified approach are exemplified by electronic knowledge repositories

(EKR), which store codified knowledge for future reuse (Markus, 2001), including databases about client and customers, industry best practices, and product knowledge (Lawton, 2001). Davenport and Prusak (1998) reported that 80% of KM initiatives they studied involved the use of EKRs

Less is More

Hansen and Haas (2001) quote a corporate manager at Hewlett Packard: "Five years ago, business unit people complained that they did not get enough information from us. Today they complain that they're drowning in information". In an empirical analysis of document hits in a large management consultancy company, they conclude that less is more. Their results revealed an apparent paradox of information supply, that "the less information a supplier offered, the more it was used, because the supplier developed a reputation for quality and focus". They suggest that this view of competition for attention has general application in information markets.

Quality

Kankanhalli, Tan and Wei (2005) study information-seeking behaviour of employees, looking at what motivates them to access EKRs, drawing on the theories of planned behavior and task-technology fit. According to the theory of planned behaviour, intended usage of a technology depends on the person's attitude to the technology, its perceived usefulness, subjective norms, and behavioural controls (Taylor & Todd, 1995). The theory of task-technology fit suggests that technology utilisation is governed by the match between technology features and the requirements of the task (Goodhue & Thompson, 1995), including task tacitness and task interdependence where employees need to share resources or expertise.

A survey was administered to 160 knowledge professionals in public-sector organizations in Singapore who had accessed EKRs in the course of their work. Results reveal that perceived output quality directly affects EKR usage for knowledge seeking, consistent with Hansen and Haas's work. Resource availability (in terms of opportunity and time) affected knowledge seeking when task tacitness was low. Incentives in the form of salaries and career advancement also affect EKR usage when task interdependence was high. Ease of use was much less important than expected, which the authors attributed to the information literacy of the sample group.

Selecting IS Development Methodologies

Over a thousand information system development methodologies (ISDM) have been developed (Jayaratna, 1994; Avison and Fitzgerald, 2006) that provide consistent frameworks for developing and implementing knowledge management systems. Nevertheless, Chalmers and Grangel (2008) note that there is still room for improvement (McInerney and Day, 2002). The main reason for KMS implementation failure is lack of an ISDM that is "specifically oriented towards the development of a KMS that reduces the complexity of the process". Users, for example, are not helped to define their information requirements simply by helpful templates with illustrative examples.

The authors report on a general methodology developed by the IRIS Group at the Universitat Jaume I in Spain which was applied to KM in a large textile enterprise, summarised in the table below, based on five phases of analysis and identification of the target knowledge, extraction of the target knowledge, classification and representation, processing and storage, utilisation and continuous improvement.

Table 8. KMS-IRIS Methodology for knowledge management in an organisation

PHASES	ACTIVITIES	TECHNIQUES	EXPECTED RESULTS	COMPUTER SUPPORT TOOLS
PHASE I. Identification	<ul style="list-style-type: none"> • Identify the conceptual blocks of knowledge • Classify into ontological categories • Define the target knowledge (knowledge requirements) 	<ul style="list-style-type: none"> • Templates and questionnaires to identify blocks of knowledge • Reference models concerning the target knowledge 	<ul style="list-style-type: none"> • Conceptual blocks of knowledge • Target knowledge • Categories 	<ul style="list-style-type: none"> • Office automation tools • Modelling tools
PHASE II. Extraction	<ul style="list-style-type: none"> • Extract knowledge from sources in order to define the input variables and categorise it • Define the extraction and calculation procedures 	<ul style="list-style-type: none"> • Templates to define the input variables • Reference models for extracting and calculating target knowledge 	<ul style="list-style-type: none"> • Set of input variables • Extraction and calculation procedures 	<ul style="list-style-type: none"> • Office automation tools • Modelling tools
PHASE III. Representation	<ul style="list-style-type: none"> • Establish the relations within the target knowledge • Draw up the knowledge map 	<ul style="list-style-type: none"> • Metamodelling (UML) • Ontologies • Conceptual maps 	<ul style="list-style-type: none"> • Model of the Knowledge map 	<ul style="list-style-type: none"> • Modelling tools • Ontology engineering tools
PHASE IV. Processing	<ul style="list-style-type: none"> • Develop the technological infrastructure supporting the knowledge map by following an object-oriented methodology for the development of computer systems 	<ul style="list-style-type: none"> • BPM techniques • ETL techniques • Document/DBMS • Data warehouse • OLAP • Data mining 	<ul style="list-style-type: none"> • Knowledge portal (Executable knowledge map) 	<ul style="list-style-type: none"> • BPM tools • ETL tools • Document/DBMS • Data warehouse • OLAP • Data mining
PHASE V. Utilisation	<ul style="list-style-type: none"> • Establish training and continuous improvement mechanisms among the members of the organisation • Carry out maintenance and the feedback process on the knowledge management system 	<ul style="list-style-type: none"> • e-Learning • Groupware • TQM • ISO standard of quality 	<ul style="list-style-type: none"> • Efficient use of knowledge within the organisation 	<ul style="list-style-type: none"> • Office automation tools • Modelling tools • Learning tools

6.2 Linking with Other Domains

IS/IT features across all domains as a medium for sharing knowledge. Some of the overlaps are noted here.

6.2.1 Organisational Form

Verona, Prandelli and Sawhney (2006) explore use of IT through the internet to create new organisational form in "Innovation and Virtual Environments: Towards Virtual Knowledge Brokers".

6.2.2 Organisational Learning and Cognition - Technology versus Experience

Matsuo and Easterby-Smith (2008) explore how business professionals learn, both through sharing knowledge with others, and from their own direct experience. Technology-based systems, with efficient dissemination, are contrasted with personalised approaches which rely on shared "knowing". They conclude that there is often a trade-off between the two and that more computer-based learning means less shared experiential learning. This is the "knowledge-sharing dilemma." However, they also find that when employees are encouraged to customize technology-based knowledge for their own purposes this will actually enhance their capability for experiential learning.

6.2.3 Critical Theory

Hanlon *et al* (2005) consider NHS Direct, a nurse-based, 24-hour health telephone advice line run as part of the UK's National Health Service. It aims to standardise "and control" the caller-nurse relationship through the use of

innovative health software. It militates against clinical autonomy and goes against the grain because "healthcare is fundamentally about interpretation and intersubjectivity" (p167). The application of IS/IT in this context is not seen as a good thing.

6.2.4 Resource Based View of the Firm

Sher & Lee (2004) conduct a questionnaire survey of major Taiwanese companies. Their research question was "Does knowledge management (KM) contribute to the enhancement of dynamic capabilities and thus to the enhancement of business excellence and competitive advantage?" and their answer was "yes".

Newell, Scarbrough and Swan (2001) show how IT can paradoxically work against knowledge management. They conduct 3 IT case studies in "Eurobank", a European single financial-services company, using 10 interview accounts repeated over 2-3 years to consider the role of IT in KM and, by inference, performance. The intranet created electronic fences, reinforcing boundaries, rather than building bridges. They also observed that "knowledge-sharing via intranet technologies may be most difficult to achieve in contexts where knowledge management is the key objective."

6.2.5 Communities of Practice

Vaast (2005) investigates how use of web-based Information Technology affects standard work practices and communication patterns within a national health public administration. Using a situated learning perspective, Vaast appears to have found that there is interaction between behaviour and IS/IT. In other words, peoples' practice offline was modified by their practice on-line. Hew & Hara (2007) explored the motivators and barriers to knowledge sharing of three professional practices: advanced nursing practice, Web development, and literacy education. The most common type of knowledge shared across all three environments was practical knowledge. 'Collectivism' and 'reciprocity' were the main motivators for knowledge sharing.

6.2.5 Barriers, Enablers and OD/Transformation

Doolin (2004) considers information systems to highlight social and political processes in a hospital in New Zealand. He draws particular attention to the role of IT in facilitating power and control in the organisation, using Michel Foucault's perspective on power to explore the application of IT in surveillance and monitoring. IS/IT is analysed as a mechanism for shifting balances of power rather than as tools of knowledge management.

Hall and Goody (2007) study IS/IT in its positive role of knowledge sharing, but also consider barriers, asserting that "[i]t is well known that the optimism associated with the development of systems to promote knowledge sharing in the 1990s proved to be misguided" (p182).

6.2.6 Positivist Knowledge Transfer (KT) and Performance

Pro-Innovation Bias

Newell *et al* (2000) present a knowledge-focused perspective to explain the diffusion and adoption of complex integrating technologies. Business process re-engineering (BPR) is used as the example to illustrate the model but, it is argued,

the model is relevant to any complex IT-based innovation since it is concerned with the spread of the ideas and knowledge that underpins technology. They challenge the notion that knowledge can be commodified, rejecting the “inherent pro-innovation bias” that BPR or any other complex technology can be effective and that any problem is an implementation failure within the user firm.

More Sharing is Not Always Better

Haas and Hansen (2005) take a “situated performance perspective” on the value of knowledge in firms. They found that in some situations higher quantities of knowledge sharing sometimes hindered rather than helped sales teams in their attempts to win new client contracts. Experienced teams were slowed down and hampered by obtaining and using electronic documents, and were more likely than inexperienced teams to lose the sales bids when they accessed this knowledge. The implication is that the costs of knowledge sharing, in terms of electronic documents and personal advice from colleagues, may sometimes outweigh the benefits. In research terms, investigators need to “examine the costs as well as the benefits of different types of knowledge content and processes, and the implications for task-level performance outcomes.”

Horses for Courses

Haas and Hansen (2007) continued their investigation of use of personalised information and codified technologies in a study of 182 sales teams in a management consulting company. They developed a ‘differentiated productivity model of knowledge sharing in organizations’ in which they proposed that different types of knowledge have different benefits for task units. They found that sharing codified knowledge in the form of electronic documents saved time during the task, but did not improve work quality or signal competence to clients. In contrast, sharing personal advice improved work quality and signalled competence, but did not save time. They concluded that their findings ‘dispute the claim that different types of knowledge are substitutes for each other’; “using high-quality documents did not substitute for the effects of using high-quality personal advice, or vice versa” (p1149, 2007).

6.3 Exemplar Papers

6.3.1 Most Cited – KM is more than a technical activity

Alavi & Leidner’s (2001) paper may be regarded as a classic, with 495 citations, ranking ahead of all other papers in the review in terms of impact. It seeks to establish a conceptual framework within which to build a knowledge management system.

Box 12. Abstract from Alavi & Leidner (2001)

Knowledge is a broad and abstract notion that has defined epistemological debate in western philosophy since the classical Greek era. In the past few years, however, there has been a growing interest in treating knowledge as a significant organizational resource. Consistent with the interest in organizational knowledge and knowledge management (KM), IS researchers have begun promoting a class of information systems, referred to as knowledge management systems (KMS). The objective of KMS is to support creation, transfer, and application of knowledge in organizations. Knowledge and knowledge management are complex and multi-faceted concepts. Thus, effective development and implementation of KMS requires a foundation in several rich literatures.

To be credible, KMS research and development should preserve and build upon the significant literature that exists in different but related fields. This paper provides a review and interpretation of knowledge management literatures in different fields with an eye toward identifying the important areas for research. We present a detailed process view of organizational knowledge management with a focus on the potential role of information technology in this process. Drawing upon the literature review and analysis of knowledge management processes, we discuss several important research issues surrounding the knowledge management processes and the role of IT in support of these processes.

The paper established that knowledge management systems, even in their technical form, need to be responsive to forms of knowledge and therefore informed by theory. For example, the implication of the 'knowledge system' approach is that KM is based on processes linked to individuals, that may then contribute to communities of practice or groups who interact to form the organisation; groups share 'episodic' memory which is linked between communities via group gate-keepers or internal boundary spanners. Alavi & Leidner establish a research agenda, highlighting the need for empirical work:

1. What conditions facilitate knowledge creation in organisations?
2. What incentives are effective in encouraging knowledge contribution and sharing in organisations?
3. How can knowledge be effectively transferred among organisational units?
4. How can an organisation encourage application of knowledge that is made available?
5. What are the consequences of increasing the breadth and depth of available knowledge, via information technology, on organisational performance?

6.3.2 Interesting Paper - Personal Epistemological Frameworks

Box 13. Abstract from Skok & Kalmanovitch (2005)

The research study discussed here examined the role and effectiveness of intranet technology in the process of creating and managing knowledge for the Social Services Department of Surrey County Council, which is one of the largest local authorities in the UK. Based on an analysis of the literature in the field, we devised an intranet evaluation model (IEM) using both technical (hard) and human (soft) factors. It made use of an epistemological framework to elicit user mental models from across an organisation via a survey. The model was able to identify gaps, mismatches and failings in the knowledge management efforts. These were summarised in an easily understandable diagrammatic form, using knowledge evaluation maps; these showed the gap between the current and desired intranet roles for the different user groups within the council.

The paper concludes by demonstrating how factors, such as the different mental models of the user groups can determine the effectiveness (or otherwise) of an intranet in managing organisational knowledge. It also contains recommendations of services that need attention in the council operations and suggests how the IEM could be used as a consulting tool for organisations seeking to evaluate their own knowledge management work on a continuous basis.

Skok & Kalmanovitch (2005) resort to individual epistemological frameworks, to escape the complexity of academic debates over types of knowledge, which are removed from the doing of it. They nevertheless use a framework:

- Cognitivist view - intranet is a cost-effective, standardised, technological solution to deal with information chaos, helping to process facts and figures that the human mind could not manage.
- Connectionist view - intranet is an information tool designed around community groups who share the same interpretation processes
- Autopoietic view –intranet is a communication tool to facilitate a 'people oriented' process of socialisation, enabling individuals to identify relevant staff for making contact.

They used an evaluation process which, they concluded, was largely successful in its application and confirmed existing knowledge management and IT theories.

7. Barriers to Transfer and Facilitators of Organisational Development (Phase 1 Management Literature)

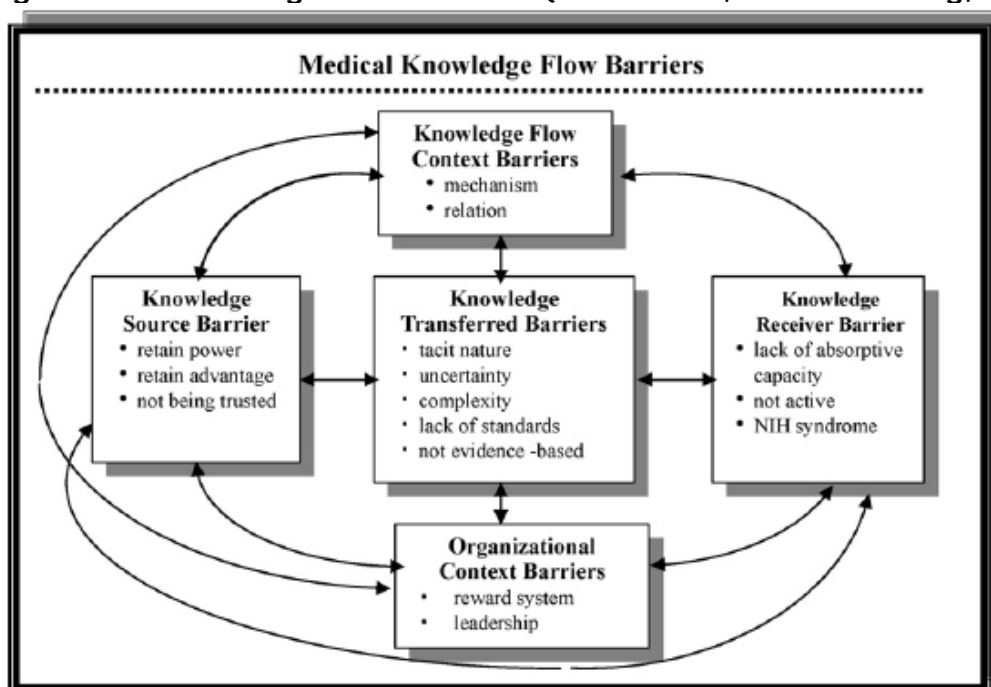
The organisation may be perceived as a unit that is capable of change and development through transformative processes. Conversely, forces may inhibit development by putting up barriers to knowledge sharing. This domain is concerned with organisational change and barriers in and around the organisation that would impede knowledge transfer.

The negative dimension (barriers) overlaps with the Critical Theory domain in its identification of power and culture as environmental conditions. The enabling and motivating dimension is similar to Knowledge Transfer and Performance, since it involves dynamic movement. This OD domain is less positivistic in its approach, however, taking a socialised or “soft” rather than commodified view of knowledge and the organisation.

This domain is almost entirely empirical in its approach, generally through use of case study methods to explore barriers and enablers to information and knowledge flows. The balance of literature here points towards barriers rather than motivators of knowledge sharing. Value-laden and vivid terms are employed in the papers’ titles, e.g. “exploitation,” “contamination”, “resistance”, “fear”, “compromise” (Empson 2001; Doolin, 2004; Hall & Goody, 2007).

7.1 Framework of Barriers

Figure 12. Knowledge Flow Barriers (Source: Lin, Tan and Chang, 2008)



We adapt Lin, Tan and Chang’s (2008) model above as a framework to consider barriers to flow and transfer of knowledge under the following headings:

- Context: Culture, incentive

- Transfer: Knowledge characteristics; simplistic nature of 'off the shelf' prescriptions for change
- Source and Receiver: Fear in individuals, perceptions, power and resistance, lack of trust, burnout (Leiter, 2007)
- Organisational mechanisms and support

7.1.2 Context

An inappropriate mix of individual incentives and cultural norms of trust and co-operation (Amit & Schoemaker, 1993; Starbuck, 1992) inhibit knowledge sharing.

Incentives

In a Professional Service Firm the individual professional's technical and client knowledge represents their source of value to the firm (Alvesson, 1993; Lowendahl, 2000) and therefore power, which would be diminished as soon as it is codified and shared. There is an incentive for the individual to hoard their knowledge and "resist the firm's attempts to establish 'property rights' over his or her knowledge (Morris, 2001)" (Empson, 2001, p843).

Culture as Power

Hall and Goody (2007) assert that typically "the focus of papers on this topic falls on *barriers* to knowledge sharing, rather than enabling factors" and that "the most significant barrier to effective knowledge sharing is culture" (p182). They contend that 'culture' is a catch-all category to explain failure and that it would be more instructive to call it a 'power relationship' (p187). They start from the premise that the organisation is trying to implement a knowledge management programme and then suggest that actor-network theory should be deployed to analyse it and to overcome barriers. An actor-network can be represented in a diagram that charts the relative positions and potential power shifts of individual actors over time.

Culture as Shared Beliefs and Business Goals

McDermott and O'Dell (2001) also contend that culture is the key inhibitor of effective knowledge sharing. They define culture more generally as the "shared beliefs and practices of the people in the organisation", depicted in the tree figure below. The visible dimension is expressed in mission statements and aspirations. The invisible dimension is tacit, relating to unspoken core values, e.g. "be careful to avoid risk".

The visible and invisible dimensions are linked by behaviour.



Figure 13. Depicting Organisational Culture

Five companies were studied as best-practice examples (selected from 40 companies) to observe culture more closely: American Management System, Ford Motor Company, Lotus Development Corporation, National Semiconductor Corporation, PricewaterhouseCoopers LLP. All the companies saw knowledge sharing as a practical way to solve business problems. "They

repeatedly emphasize that databases, knowledge systems, and knowledge initiatives need to have a clear business purpose" (p79). In addition, the companies identified the overriding source of failure in KM projects as "a lack of a clear connection with the business goal" (p79). There should be no attempt to launch a 'change program' or a 'new direction' but instead integrate KM with existing style and values. The implication is that running a knowledge management programme as an explicit initiative risks being side-lined. This is not incompatible with Hall and Goody's analysis above, but suggests that anything perceived as "a project" has the odds stacked against it.

7.1.3 Transfer

Knowledge Characteristics

Characteristics of knowledge are relevant as conditions or constraints to transfer, for example:

- much knowledge is tacit and difficult to articulate (Nelson & Winter, 1982; Nonaka & Takeuchi, 1995; Polanyi, 1966);
- embedded knowledge is context-specific (Brown & Duguid, 1991; Kogut & Zander, 1992; Reed & DeFillippi, 1990);
- absorptive capacity of the receiving organisation is a function of its prior knowledge (Cohen and Levinthal, 1990);
- "viewing knowledge as a social process implies not taking processes of knowledge transfer and change for granted" (McNulty, 2002, p442).

Distance

Distance between the original arena of the idea and its new one has been identified by Morris & Lancaster (2006) as an important condition for translating ideas. Lillrank (1995) suggests that innovation operates at several levels of abstraction. Techniques and tools with low levels of abstraction can be picked up and easily adapted but, lacking systemic content, may be misapplied. High-level abstract principles have the chance of travelling further, but need to be repackaged because they lack specificity. Distance, in terms of geography and context, matters. Users need to edit ideas to effect translation.

Complexity

Parent *et al* (2007) note that the transfer gap between academic research and practice is long-standing and distributed across most disciplines that contain researcher-practitioner communities (Rynes *et al*, 2001; Glaser *et al*, 1983; Leontief, 1982; Rogers, 1995; Beyer and Trice, 1982). Susman and Evered wrote 30 years ago:

"There is a crisis in the field of organizational science. The principal symptom of this crisis is that as our research methods and techniques have become more sophisticated, they have also become increasingly less useful for solving the practical problems that members of organizations face." (Susman and Evered, 1978, p582)

Market Pressures

Market forces and economic disadvantage will create demand for innovation. This

was observed in the 1990s when the NHS was restructured into an internal market and competition between hospitals was stimulated (McNulty, 2002); managers felt that the hospitals faced "desperate" and "hard-pressed" conditions.

7.1.4 Source and Receiver

Trust

Trust was an important condition for knowledge sharing in an internal market (Davenport & Prusak, 1998; Nahapiet & Ghoshal, 1998; Teece *et al.*, 1997). Ardichvili *et al* (2003) identify lack of trust as a barrier to knowledge sharing: "employees hesitate to contribute out of fear of criticism, or misleading the community members (not being sure that their contributions are important, or completely accurate, or relevant to a specific discussion)." (p64). To remove the barriers, they suggest that there is a need for developing various types of trust, ranging from knowledge-based to institution-based trust.

Fear and Loathing

Fear is associated with mistrust. "I think their consulting practice is awful and their people are just awful" (p839), reports Empson (2001) in a case study of a merger between professional service firms. She identified 'fear of exploitation' and 'fear of contamination' as two key factors impeding trust and therefore knowledge transfer when management consultancy companies merged. Fear of exploitation describes problems arising from attempts to transfer technical knowledge, stemming from a potential imbalance between tacit and explicit knowledge. Consultants with tacit expertise fear the consequences of codifying their knowledge, and regard the codified knowledge of their counterpart as unsophisticated; by contrast, those with codified knowledge do not respect or rate the tacit knowledge of the other consultants.

Fads and Fashions

Research has tended to focus on how the supply-side of ideas, occupied by gurus, consulting firms and business schools, push their ideas through market mechanisms, with the result that "at the extreme, recipients of ideas can be portrayed as dupes of influential carriers" (Morris and Lancaster, 2006, p207). 'Success models' are used to energise users, as a result of which ideas become disconnected from context and take on objectified forms of recipes or metaphors (Czarniawska and Joerges, 1996). Engwall & Kipping (2004) comment that the advice industry, in the form of business education and management consultancies, focused initially on productive efficiency, then on strategy, organisation marketing and finance, and more recently on IS/IT. As a consequence there has been an expansion of media products focused on management.

Off the Shelf Solutions

Business process re-engineering was considered to be one of the most high profile ideas related to process organisation (Denison, 1997) and became a focus for change programmes, imported from the US (e.g. Hammer and Champy, 1993). It was "promoted as best practice for transfer "off the shelf" across diverse organizational settings to effect change in organization process and performance" (McNulty, 2002, p442).

Translation and Editing

Translation is the process in which a general idea is transferred and reinterpreted in a new setting (Czarniawska and Sevón 1996; Sahlin-Andersson and Engwall 2002). Sahlin-Andersson (1996) suggests that translation of ideas is guided by editing rules which proceed by: "(1) rules of context which help *re-contextualize* an idea, by disconnection from its previous, local context and being made appropriate for the new one; (2) the *relabelling* of an idea in an appropriate way (called a rule of formulation) so that it seems different but familiar. Relabelling also offers explanations for why the idea is a success; (3) editing entails use of a *plot* or rules of logic that clarify causes and effects, allowing prototypes to follow a problem-solving logic and an application process or implementation plan, to be explained in relation to the actions of certain actors" (in Morris and Lancaster, 2006, p213). Editing allows migration from broad context to local action.

Burnout

Leiter *et al* (2007) identify burnout as "a chronic syndrome of exhaustion, cynicism, and low professional efficacy that is prevalent among people working in service and knowledge sectors in the economy (Leiter & Maslach, 2004; Maslach *et al*, 2001)" (p262). Burnout damages workers' capacity to accept new challenges (Leiter & Harvie, 1998) and "exhaustion, cynicism and efficacy" are attributed to the workplace rather than individual qualities (Leiter & Laschinger, 2006; Schaufeli & Enzmann, 1998).

7.1.5 Organisational Mechanisms and Relations

Limits of managerial power and influence in hospital settings constrain attempts to introduce new ideas. Aspirations to change ways of doing things, by importing knowledge from the private sector, may generate an unforeseen clash with established functional logic of clinical specialties and directorates (McNulty, 2002).

Clinical specialties and resources in hospitals are inter-dependent in a way that may not be explicit, requiring specialist sector-specific knowledge, and acting as a barrier to change, e.g. presence of critical care determines whether a hospital provides urgent or emergency care; critical care needs to function at a minimum threshold volume of patients (Academy of Medical Royal Colleges, 2007). 'Functional' in clinical terms may not adhere to models of process or economic efficiency since empty capacity may be valid to keep a hospital open.

7.2 Case Studies

7.2.1 Merger of PSF

Mergers are depicted as an efficient means of acquiring new knowledge (e.g. Barney, 1996; Haspeslagh & Jemison, 1991; Penrose, 1959), without the cost involved in developing knowledge organically in-house. Yet merger announcements generate an environment of stress and insecurity (Cartwright & Cooper, 1992; Mirvis & Marks, 1992), leading to negative reactions (Buono & Bowditch, 1989; Levinson, 1970) stimulated by fear (Hunt *et al*, 1987; Schweiger & Denisi, 1991).

Empson (2001) conducted a multi-site, multi-phase, multi-source case-based study through inductive analysis of interview data, addressing the question "Why

do individuals resist knowledge transfer in the context of mergers between PSFs?" Three cases (six firms) were selected, using 177 semi-structured interviews of 90 minutes each involving 92 people, together with archival data. She called the case study sites Sun/Moon, Land/Sea and Hill/Valley and identified 'fear of exploitation' and 'fear of contamination' as two key factors impeding trust and therefore knowledge transfer.

Hill/Valley

- There are three or four key players in Hill UK. The rest are just a load of techies. We look upon ourselves as strategic architects. The Hill guys are more like plumbers. (Consultant, Valley)
- People at Hill say it is like the emperor's new clothes. Valley's change management offering is just a hologram. It is all smoke and mirrors. (Consultant, Hill)

Fear of contamination describes problems arising from contact with each other's clients, where one company regards itself as more upmarket than the other.

Sun/Moon

- The average intellectual content of any of us is not enormous, but we are solid and polite . . . we are jolly nice people and we know how to use a knife and fork. (Partner, Moon)
- We are concerned about the impact they may have on our brand image. When they walk through the door they don't look the way that clients are expecting a Sun partner to look. They are older and dress differently. They aren't stupid. They can do good work for clients. But they don't look right. (Partner, Sun)

Sea/Land

- Some Sea people are saying – who are these hairy arsed guys? Is my reputation as an elite strategy consultant going to be sullied by contact with these labourers? (Manager, Sea)

The contamination theme is suggestive of the relationship between organisational identity and concept of self (Albert and Whetten, 1985; Hatch and Schulz, 1998), linking job threats to an anxiety about self worth (Alvesson, 2001).

7.2.2 Implementing IS/IT in a Hospital

A casemix information system had been introduced in the 1980s as a means of recording and disseminating information on clinical activity and cost of resources (Doolin, 2004). Information at patient level was aggregated and analysed to generate profiles of the cost of patient care, e.g. the number of pathology tests and days spent in hospital linked to types of treatment and individual doctors. The New Zealand health sector was reformed in 1993 with introduction of a purchaser-provider split together with a national tariff for treatment. Casemix data suddenly became important, increasing visibility of profit or loss-making areas of the hospital.

Although implementation of the casemix system needed clinical participation, there was little incentive for doctors to co-operate. It was viewed as a management tool without any clinical benefit, which was "then used as something to batter them round the ears with, control, an audit" (p350). The system was sold to doctors as an 'effectiveness' tool, based on discourse about clinical quality, but effectiveness was ultimately linked to resources, meaning 'efficiency', which is much less interesting to doctors. It was also envisaged as a way of

bringing doctors into management, by calling on doctors to conduct casemix-based review, "manoeuvring those doctors into defined positions where they accept such responsibility. (Bloomfield *et al*, 1992, p199)" (p352)

Doctors did not like the system. Apart from initial scepticism about the quality and purpose of the casemix data, they resisted intrusion by managers in their professional domain, fearing for their autonomy and clinical freedom. Specialties where patient episodes were well defined, e.g. surgery, allowed for greater control to be imposed than where care is less formulaic, e.g. medicine. Doolin notes that "In effect, many doctors at the hospital were resisting their constitution as users and subjects of casemix information (Bloomfield & Vurdubakis, 1997; Bloomfield *et al*., 1997):

'I choose to ignore it most of the time . . . All casemix seems to have been so far, to me, is a way for the Regional Health Authority to describe what they're going to buy, and I guess I'm not prepared to have the case mix dictated in that fashion. If patients need treatment they need treatment . . . I'm not prepared to have my practice organized in that fashion. (Interview with a medical consultant, September 1996)' "(p354)

Doolin describes how the doctors were able to engage with the information system and use it to their own ends, e.g. analyse the comparative data to demonstrate a level of underfunding in their specialty. He speculates on the "transformation of individuals into calculating and normalized subjects" since the comparative surveillance systems "open up a new and legitimate discursive space for action" (p355). In principle the new imposed norms could become internalised and used in self-regulation, but in practice Doolin did not observe much evidence that doctors used the casemix system in their work. "If a discourse is not pervasive, and its associated practices are not routinely performed, then disciplinary power is not exercised" (p356).

Doolin views the initiative through the perspective of "attempted normalization of medical practice through the increased surveillance of doctors and clinical activity" (p349) (Chua and Degeling, 1993). Medical resistance provided one explanation for the weak power of the casemix information system in controlling doctors. Lack of 'formative context' provided the second (Ciborra & Lanzara, 1994). The system had been imposed upon the hospital management from a top-down national drive, and so the organisational culture did not respond with any alacrity: " 'the anticipated management style did not occur'...Interview with medical consultant" (p357). Further reorganisation of the hospital in 1999 led to loss of the newly formed semi-autonomous clinical business units, negating the need for change in the formative context and dissipating any impetus for using the system. "The widespread use of casemix information throughout the hospital never eventuated" (p358). Its use was reserved for contract discussions between hospital managers and the health-authority.

The interpretive and critical nature of Doolin's research demonstrates how a theoretical framework based on power can make sense of organizational change. Incompatibility with core objectives of the organisation is an alternative reasonable explanation of failure (in line with McDermott *et al*, 2001). The power struggle depicted between doctors and managers is an example of divergent goals and interests, demonstrating why private sector models cannot be directly imported to the NHS without taking account of its distinctive context and professionalized structure.

7.2.3 Patient Safety and Service Quality

Currie *et al* (2008) describe the introduction of a critical incident reporting system called the National Reporting and Learning System (NRLS), intended to promote learning in the NHS and improve patient safety. Barriers between managers and professionals, between doctors and nurses and between individuals or groups in different organisations produced cultures in which people were more likely to hoard knowledge than to share it. The nature of knowledge, (e.g. as tacit and subjective), culture (e.g. trust between clinicians and managers) and power (e.g. between doctors and nurses) formed three conceptual categories that all acted as barriers to knowledge sharing.

7.2.4 Lean Management in the Construction Industry

The principles of lean management have been built up by the Japanese car maker Toyota from the 1950s as a way of dealing with waste in the production system. The term 'lean management' was coined by observers in the process of translation from practitioners to academic observers. The idea is to pursue productivity and efficiency as a *modus operandi* and to do more with less (Womack *et al*, 1990). Morris and Lancaster (2006) investigate the adoption of lean management in the UK construction industry, which "has long been regarded as a problem case" (p212) embodying low productivity and poor quality. The Egan report (1998) exhorted the industry to emulate Toyota and adopt lean thinking. A Construction Best Practice Programme was established, with a knowledge centre and virtual information network.

Because of the structure of the industry, hierarchical control of the translation process was limited and so persuasion and interest alignment was important. Policy makers and clients used editing rules. They recontextualised lean management by framing it as an answer to the familiar waste and supply-chain problems in the industry. They relabelled it as part of a wider process of modern management. The third rule of editing, providing a plot line to explain cause and effect explanations of success, was limited. Instead policy makers provided best practice examples to allow industry to customise the idea, suggesting that distance between policy and practice was not a problem. This gave latitude and also meant that industry carried markedly different versions of 'lean' into practice. In practice, the editing rules did not happen sequentially.

Morris and Lancaster also looked in the industry at three ideal-types of organisational change – engineering (systems and organisation), socialising (behaviour) and teaching. Hybrids of these ideals were found to be necessary, effecting changes to systems, behaviour and work organisation. Hybrid change was consistent with Latour's (1987) argument that interest alignment was necessary in the absence of hierarchical control.

7.2.5 Business Process Reengineering (BPR) in a Hospital

McNulty (2002) describes a BPR programme in a UK hospital in the 1990s. Uptake of BPR was interpreted as a guru-driven initiative as adhering to "the explicit prescription of reengineering gurus (Hammer & Champy, 1993)" (p447).

BPR is conceptualised as a knowledge change programme where knowledge creation and innovation involve interaction between 'knowledge' and 'knowing'. 'Knowing' is tacit knowledge generated and employed in situated practice and 'knowledge' is the use of formal or explicit knowledge as a tool to effect action (Cook and Brown, 1999).

Four re-engineering laboratories were established to review hospital processes and redesign them across patient stay, patient visit, emergency entry and clinical support, for example by reducing patient length of stay in hospital. They were ultimately re-engineered themselves as they were dismantled within 12 months.

Re-engineers and clinicians were at odds with each other because they had different perceptions of the function of the accident and emergency (A&E) department. 'Queue management' objectives of re-engineers had no bearing on the doctors' view of the department as an autonomous jurisdiction. "A&E is a specialty in its own right ... A&E is very important and has a vital role to place in the hospital structure and it should be regarded as a separate specialty (A&E doctor)" (p453). Managers were also critical: "one of my criticisms of reengineering is that it has a model and everything fits in, instead of changing the model to fit the specialty" (p453).

In the end, "second-order rhetoric gave way to first-order impact that largely converged with established organizational form and performance (McNulty and Ferlie, 2002; Bowns and McNulty, 1999)" (p440). McNulty suggests that the case "counters contemporary hype about the possibilities for effecting changes in organizational form, process and performance" (p455).

7.3 Lists of Barriers and Enablers

7.3.1 Guidelines

As an antidote to the litany of barriers that populate this domain, we have extracted some guidelines or checklists that have been published to overcome barriers on the basis of empirical investigation.

Box 14. Guidelines to Overcome Barriers (Source: McDermott & O'Dell, 2001)

- (1) To create a knowledge sharing culture, make a visible connection between sharing knowledge and practical business goals, problems or results.
- (2) It is far more important to match the overall style of your organization than to directly copy the practices developed by other organizations. To make sharing knowledge a natural step, think through how effective change happens in your organization. Make the visible artifacts of knowledge sharing \pm the events, language, Web sites \pm match the style of the organization, even if you intend to lead it into new behavior and approach.
- (3) Link sharing knowledge to widely held core values. Don't expect people to share their ideas and insights simply because it is the right thing to do. Appeal to something deeper. By linking with core values of the organization values, you make sharing knowledge consistent with peers' expectations and managers' considerations. Align your language, systems and approach with those values. The values you link to do not need to obviously support sharing knowledge, but people do need to genuinely believe in them. They cannot simply be the "espoused values" in the company's mission statement.
- (4) Human networks are one of the key vehicles for sharing knowledge. To build a sharing culture, enhance the networks that already exist. Enable them with tools, resources and legitimization.
- (5) Recruit the support of people in your organization who already share ideas

and insights. Ask influential people and managers to encourage and even pressure people to share their knowledge. Build sharing knowledge into routine performance appraisal. Other people's behavior, like alignment with business results and core values, is a powerful determinant of one's own behavior.

Even when you plan to use sharing knowledge as a way to change the organization, our research suggests that the best strategy, ironically, is to first match the values and style of your organization. Don't start out a new campaign and new structures for sharing knowledge. Find the knowledge sharing networks that already exist and build on the energy they already have.

Box 15. Guidelines for Managerial Action (Source: Guzman & Wilson, 2005)

Guidelines for managerial action have been categorised in seven groups. In each group, key questions are formulated to aid practitioners make explicit, be aware and understand "soft" issues. It should be noted that the importance of those managerial implications is a direct function of the degree the situation is open-ended, the external environment is uncertain/ambiguous, shared organizational goals are few and the extent to which organizational templates are highly abstract.

1. The micro-macro link:
 - Which are the underlying reasons to transfer (either receiving or sending) an organizational concept?
 - How do specific macro contextual factors affect personnel involved in terms of collaboration, motivation, trust and willingness?
 - Who governs the organisational knowledge transfer process?
 - Which is the role of the receiving unit (in the sender-receiving unit)?
2. The "content" of organizational knowledge:
 - Is the concept being transferred of high or low abstraction level?
 - Which are the main assumptions of the "designers" of the organizational template regarding local conditions of operation?
 - To what extent does the implementation of the organizational concept demand trust, willingness and motivation from employees?
3. The "process" of organizational knowledge:
 - To what extent does the internal organization support trust, willingness and motivation from employees?
 - To what extent can the implementation process of the organizational concept be planned or be emergent?
4. Detecting and selecting open-ended issues:
 - Is the management prepared to use metaphors and symbols?
 - How skilful are managers in using rhetoric?
5. Interpreting and reflecting on:
 - Is management aware of the trade-off between "stability" of interpreted results versus updating and evolving the interpretation process?
 - Is management applying an equilibrated approach in the stability versus evolution trade-offs of interpreted results?
 - To what extent is the interpretation of the environment "internally social constructed (or agreed)" or "externally given"?
 - Who governs the interpretation process?
 - Who are the constituencies of the leading interpreting group/person?

6. Clarifying preferences and problem-solving alternatives:
 - Is the management aware of the single-outcome trap during the process of selecting problem-solving alternatives?
 - Is the management aware of the key role played by applied metaphors?
 - Is the management aware of pros and cons of using selected metaphors in the specific situation?
7. Gaining attention and agenda building:
 - Is the management aware of the role of “issue salience” and “issue sponsorship” in the process of gaining attention and building agendas?
 - Is the management prepared to manage “issue salience” and “issue sponsorship”?

7.3.2 Literature Review

In a review of knowledge management in the healthcare sector, Nicolini *et al* (2008) listed the barriers and enablers of knowledge management. Relationships and interaction were at the root of most barriers enablers.

Table 9. Major enablers and barriers of KM success in healthcare organizations (Source: Nicolini *et al*, 2008, p255)

Enablers	Barriers
Shared common values and culture	Over management and interference from political sphere
Minimizing concerns about power and status differences	Clinical managerial conflict
Interdisciplinarity (broad-based membership)	Professional barriers
Close proximity (operational)	Lack of trust
Salient topics	Poor quality relationship
Political commitment and endorsement	Insufficient technology skills
Loose structure	Lack of strategic breadth and leadership

7.4 Exemplar Papers

7.4.1 Most Cited – Tuning into the Organisational Culture

Box 16. Abstract from McDermott and O'Dell (2001)

Culture is often seen as the key inhibitor of effective knowledge sharing. A study of companies where sharing knowledge is built into the culture found that they did not change their culture to match their knowledge management initiatives. They adapted their approach to knowledge management to fit their culture. They did this by: linking sharing knowledge to solving practical business problems; tying sharing knowledge to a pre-existing core value; introducing knowledge management in a way that matches the organization's style; building on existing networks people use in their daily work; and encouraging peers and supervisors to exert pressure to share.

McDermott and O'Dell's (2001) paper is popular rather than scholarly with only 2 references, but has nevertheless had a high impact. It is business-oriented and sets out guiding principles (quoted earlier) on how to overcome cultural barriers. The question of interest to us is the extent to which these guidelines could be applied successfully in a UK health care setting or whether the analyses of power and competing interests of professionals and managers will render them irrelevant. McDermott and O'Dell are optimistic in their tone. Using Schultze and Leidner's (2002) language of discourses, the business discourse is consensual while the critical discourse is dissensual. The case studies situated in hospitals

(Doolin, 2004; McNulty, 2002) nevertheless lend support to McDermott and O'Dell's main message that KM needs to bend to the organisation, rather than the organisation bending to KM.

7.4.2 Interest – Policy from a Distance

Box 17. Abstract from Morris and Lancaster (2006)

Accounts of the spread of management ideas emphasizing the role of 'supply-side' actors underplay the active role recipients play in translating them into new and different forms. Comparing firms undergoing a similar process and looking at how a specific event unfolded, this paper aims to extend understanding of the concept of translation. It examines how ideas are rendered appropriate to a new setting through translation from the broad policy level into a set of specific practices. To do this, it looks at how a proposal to introduce lean management into the construction industry was applied within a set of firms and the projects they were undertaking. In the context of large 'distance' between the original arenas of the idea and its new one, the paper uncovers how the editing rules that are said to guide the process of translation are operationalized using a set of change interventions.

Morris and Lancaster's (2006) paper is of interest to health care where distant top-down policy initiatives are routinely announced and need to be adapted for local consumption. Effective strategies included translation through editing, and co-operation through interest-alignment. Interests were reshuffled by inventing new goals or by emphasising or creating a problem (waste and inefficiency, outmodedness and conflict) and then offering a solution (Latour, 1987). Supply-chain reforms were advanced as a way of helping to build better partnerships, while effecting lean management. Translation has its limits where the idea is not indispensable and, the authors suggest, will ultimately be supplanted by a new fashion.

The hospital-based case studies (Doolin, 2004; McNulty, 2002) each involved initiatives that originated at some distance from the hospital, either carried through gurus (business process reengineering) or imposed top-down through national policy (implementation of case-mix IS/IT). The editing process ended in a full-stop for BPR and relegation to a subsidiary role in the case of the unsolicited IS/IT.

8. Knowledge Transfer & Performance (Phase 1 Management Literature)

This domain captures some of the dynamic elements of knowledge management by looking at transfer, and so looking at processes or flows rather than stocks. The underlying view is generally that knowledge is an asset or commodity that can be moved around, and to that extent belongs within the resource-based view of the firm. Where 'performance' rather than knowledge or the organisation itself is the focus of attention, we assign it here.

A large body of research concludes that knowledge in organisations provides competitive advantage "including Nelson and Winter's (1982) treatise on organizational routines; Teece's (1977, 1982) analyses of technology transfer and proprietary knowledge; Nonaka's (1990, 1994) work on knowledge-creating companies; Prusak's (1997) work on knowledge in organizations; Davenport and Prusak's (1998) study of how organizations manage what they know; and Serban and Luan's (2002) overview of knowledge management. ... Many researchers have focused on the importance of knowledge transfer as a key to the organisation's competitive advantage (Cavusgil *et al.*, 2003; Dayasindhu, 2002; Lynn *et al.*, 1999; Szulanski, 1996)" (Parent *et al.*, 2007, p82).

8.1 Theories and Models

8.1.1 Knowledge Transfer Theory – From Object to Capacity

Parent *et al.* (2007) provide an account of knowledge transfer theory. Its history starts with the traditional linear model of knowledge as object that can be passed mechanistically from creator to translator to user (Dissanayake, 1986). It implies a hierarchical top-down relationship between knowledge generator and passive user (Roling, 1992; Boggs, 1992) and has been criticised for taking no account of the reality of context, at either the produce or user end (Inkpen and Dinur, 1998; Frambach, 1993; Johnston and Leenders, 1990). There are experiential models of knowledge transfer and learning that focus on theory to practice in real-life settings, including Bouchard and Gelinas's spiral model (Roy *et al.*, 1995); Lewin's (1951) cycle of adult learning; Kolb and Fry's (1975) model of experiential learning; and Honey and Mumford's (1982) typology of Learners.

Communities of practice and knowledge network models are the "latest models to capture the imagination of the research and practice communities" (Parent *et al.*, 2007, p83). Communities of practice are motivated by shared goals and experiences and "cannot be mandated, but they can be encouraged, supported and promoted" (p83). Networks, e.g. best-practice networks and business-opportunity networks, may be contrived with organisational support.

Knowledge transfer has been conceptualised as a process, within which Szulanski (1996) found that 'stickiness' of knowledge makes it difficult for the receiving unit to allow knowledge transfer to take place. The process of transfer is therefore contingent upon context and knowledge transfer capacity.

There are several types of knowledge transfer capacity. Generative capacity describes innovation and depends on the system's members, research infrastructure and alliances. Disseminative capacity is thought to be built on social capital or social networks, including strong and weak ties. Absorptive capacity (originally Cohen and Levinthal, 1990) is "typically found in

environments that possess prior related knowledge, a readiness to change, trust between partners, flexible and adaptable work organizations and management support" (Parent *et al*, 2007, p87). The fourth capacity, adaptive and responsive capacity, is second-order and reflective, looking for ways to adapt and amend in relation to the environment.

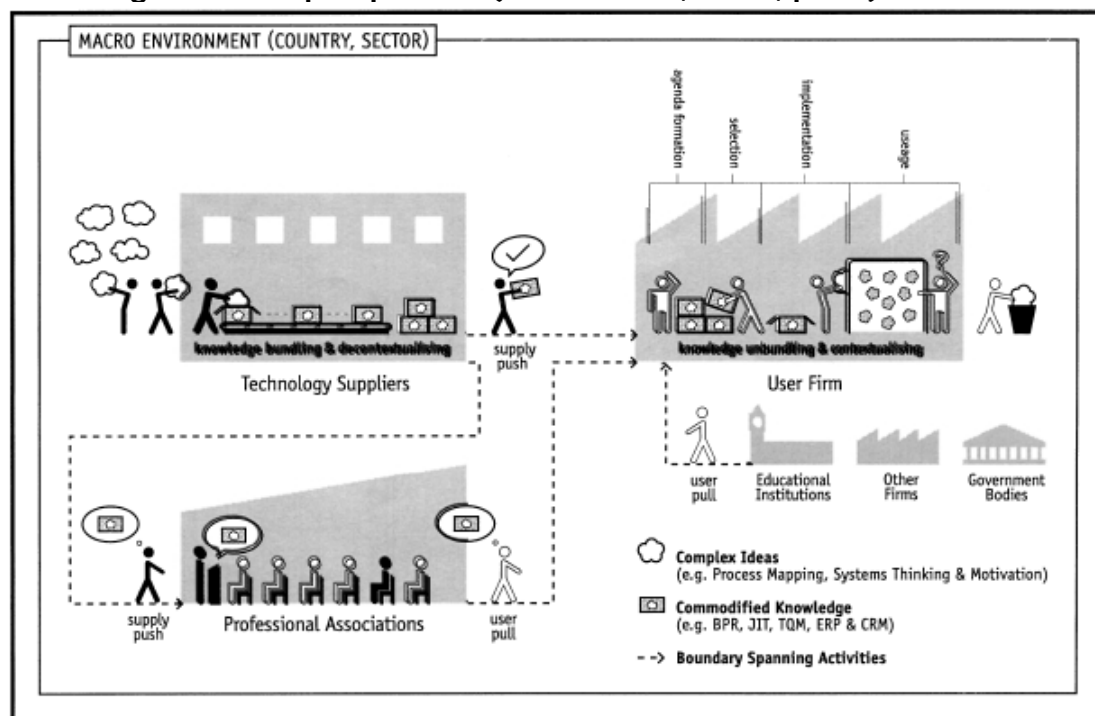
8.1.2 Innovation and Diffusion

Push and Pull

Innovation is "a socially constructed process involving the development and implementation of new ideas" (Van de Ven, 1986, in Newell *et al*, 2000, p242). There are four episodes: (i) agenda formation, setting out problems and ideas; (ii) acquisition and sharing of new ideas by organisational members; (iii) whittling down and selection of particular technologies for further development; (iv) routine usage.

Newell *et al* (2000) view diffusion as a knowledge flow, defined as "the communication, spread and adoption of new ideas among social communities (Rogers, 1962, 1983, 1995)" (p243). They suggest that traditional models of diffusion and adoption have viewed it from the supplier's perspective, e.g. attributes of the technology; potential early adopters to be targeted; social networks, including strong and weak ties that will spread news of the ideas (Granovetter, 1973; Rogers, 1983). Professional organisation networks are well placed to diffuse ideas among their members through weak ties.

Figure 14. Model explaining the diffusion of complex technologies: a knowledge-focused perspective (Newell *et al*, 2000, p251)



Supplier-focused models are criticised on the basis that they do not deal adequately with adoption of ideas that spread rapidly due to perceptions of users rather than inherent characteristics. Business process reengineering (Hammer and Champy, 1993), for example, may more adequately be explained by the fads and fashions perspective of Abrahamson (1991, 1996) whereby management

gurus and consultants promulgate rhetoric, since its complexity would lead supply-side models to predict slow diffusion. A second criticism is that they are broadcaster-receiver approaches that emphasise supplier-user relationships. Newer perspectives expand on the role of users, such as 'boundary spanning' individuals who penetrate networks to learn about new technology and disseminate in their own organisation (Tushman and Scanlan, 1981).

The authors propose a knowledge-focused model to explain diffusion of complex technologies using both supplier and consumer incentives. It involves commodification of complex ideas and repackaging to conceal their complexity. BPR is used as an example of an idea that is pushed by suppliers as a black-boxed 'best practice', sought out by users who were active in pulling the technology into the organisation. The model focuses on the spread of ideas underpinning a technology including just-in-time (JIT), total quality management (TQM), enterprise resource planning (ERP), or customer relationship management (CRM).

Contrasting Perspectives

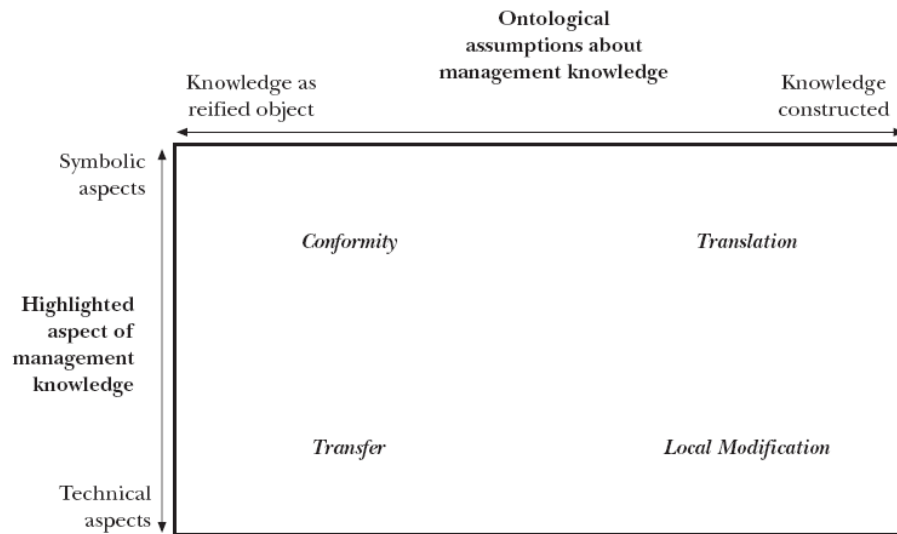
Lervik and Lunnan (2004) present four perspectives on diffusion in which 'transfer' is only one component. They apply it to a case study of adoption patterns of performance management within a Norwegian multinational company ("Multi") that operates in energy intensive industries and 50,000 employees across 60 countries. The four perspectives, tested against a prescribed performance management (PM) system introduced by the HR function, are:

- Conformity – doing things by the book and being seen to follow processes, e.g. in laying off staff, rather than use PM to achieve the best value outcome. It was not integrated into management practices. A large high profile unit undergoing major restructuring and loss of 20% of the workforce used this pattern of conformity;
- Transfer – adopting the prescribed PM and integrating it with existing management practices, e.g. in adopting yearly appraisals and reviews;
- Translation - there were symbolic modifications to the PM process (because the vocabulary of 'high potentials' was not picked up) but the technical details were observed;
- Local modification – the PM process was extended and used as a vehicle for other change. These units displayed initiative, but they were relatively small and low profile in the company hierarchy so were not under pressure to conform.

Lervik and Lunnan map these perspectives onto axes that contrast symbolic and technical aspects of management knowledge with theories of knowledge, ranging from 'knowledge as reified object' to knowledge which is 'constructed'. They then link theoretical approaches to each quadrant:

- Conformity – New Institutionalism in which "institutionalized products, services techniques, policies, and programs function as powerful myths, and many organisations adopt them ceremonially" (Meyer and Rowan, 1977/1991, p41)
- Transfer – resource based view;
- Translation – translation model by Czarniawska and Sevón (1996b) inspired by Latour (1987); focus on carriers and sources of management knowledge by Sahlin-Andersson and Engwall (2002);
- Modification – "self design strategy" recommended by Cummings and Mohrman (1987, p283); need for autonomy and experimentation (Levin, 1997).

Figure 15. Perspectives on Diffusion (Source: Lervik and Lunnan, 2004)



8.1.3 Relational Approach

Social Networks

Social networking theory is a relational approach to managerial innovation, where people acquire knowledge through informal contact with each other. The theory of 'structural holes' (Burt, 1992) suggests that a 'network broker' connects people who might not otherwise be connected. Within this sparse network of disconnected contacts, the network broker or tertius is valuable and enjoys power and prestige (Cialdini, 1998). Managers in brokering positions are generally more effective at getting what they want (Burt 1992, 2000), again enhancing their status and rewards.

"Structural holes are the setting for tertius strategies. Information is the substance (Burt, 1992, p33)" (Rodan and Galunic, 2004, p546). Heterogeneity of knowledge means variety of know-how and expertise which, it is hypothesised, will be enhanced through connection with different rather than similar contacts. "In essence, access to more diverse knowledge allows the broker to be more fully informed" (p545). It should also "raise the creative potential of the focal manager. Here the argument is not just about access to current information—news and gossip—but deeper differences in the knowledge contacts possess" (p545). Access to new ideas through diverse contacts may help sustain activity up to the point where a manager needs to move the project through a more formal route within his/her own organisation.

Rodan and Galunic (2004) conducted a study of 106 middle managers in a Scandinavian telecommunications company to answer the question 'how much does knowledge really matter?' While prior work had demonstrated a relationship between network structure and managerial performance, they argued, inadequate attention has been paid to network content. They found that (a) network structure is important to individual performance, consistent with Burt (2000) and (b) network content matters to both performance and innovation, to differing degrees. Diverse knowledge is more important to innovation than it is to performance. In terms of structure, "having a sparse network clearly matters, but we should not confound this with the distinct benefits of access to diverse knowledge through one's network" (p556).

Social capital literature tends towards the conclusion that 'networking' is a good thing (Baker, 1994), and that building a network of people who are strangers to one another is particularly advantageous. Rodan and Galunic's study tempers this view with the consideration that a diverse network does not necessarily lead to heterogeneous knowledge. The cost-benefit calculation of setting up and maintaining a network may not stack up. In the face of costs, it would be possible to state that 'networks are good, but knowledge diversity is better'. Rotation of employees through functions in the organisation, or educational opportunities, building up knowledge, might be wiser management practice than promoting internal network structures. The authors speculate that research on innovativeness of networks versus inanimate sources of knowledge is worth pursuing further. The generalisability of their findings may be influenced by the collectivist culture of Scandinavia, where people may benefit more from heterogeneity (Chatman *et al*, 1998, Hofstede, 1997), than those of individualist cultures. They also caution against assuming that access to knowledge results automatically in transfer through appropriation by the manager. Future studies, they suggest, might consider the "moderating role of relational quality to knowledge heterogeneity and its influence on performance" (p558).

Role of Network Knowledge – Cost Benefit Analysis

Dyer and Hatch (2006) asked: "Can a firm that uses the identical supplier network as competitors and purchases similar inputs from the same plants achieve a competitive advantage through that network?" (p701). The network literature suggests that this is unlikely (Gulati *et al*, 2000) but Dyer & Hatch found that the answer was "yes". They use the car industry as a case study and found that suppliers to Toyota reduced defects by 50% while the same suppliers serving GM, Ford and Chrysler reduced defects by only 26%. Toyota worked with their suppliers to share learning and improve joint performance. Inter-organisational routines in the US companies acted as barriers to learning. Relationships with the network were important, so that capabilities were not easily transferred to other buyers or networks. By teaching the "Toyota Production System" to its US suppliers, "Toyota appears to be handing over the keys of the vault" (p716). But Dyer and Hatch observe that "the US automakers are not opening the door". The costs of doing so, in terms of reworking production systems, would outweigh the benefit, because imitation is not cost-free. The use of knowledge as a source of advantage was summed up by a Toyota manager "We are not so concerned that our knowledge will spill over to competitors. Some of it will. But by the time it does, we will be somewhere else. We are a moving target" (p701).

The Social Exchange View of Learning & KT

Muthusamy *et al* (2005) combine theories of organisational learning, organisational form, RBV and knowledge transfer to look at how social exchanges facilitate learning and knowledge transfer in strategic alliances. They found that reciprocal commitment, trust, and mutual influence between partners are positively related to learning and knowledge transfer in strategic alliances. Reciprocal commitment is important because it underlines a moral obligation between partners to mutual commitment of resources in a strategic alliance (Dwyer *et al*, 1987), which increases interdependence. Trustworthiness, based on competence, integrity and goodwill, is essential to the smooth running of the alliance. Power is fundamental (Pfeffer and Salancik, 1978) in structuring inter-firm relations, so that power-sharing in an alliance is consistent with a social exchange view. The role of trust and reciprocal commitment may be counter-intuitive where there is a competitive relationship between firms, in spite of the collaborative arrangement. The authors acknowledge that social exchange

processes are shaped by cultural norms, and not exclusively by economic outcomes. They suggested that the role of national culture, organisational, cultural and structural factors in determining learning capacity (absorptive capacity) and learning outcomes would be a fruitful line of research.

8.1.4 Integrated Frameworks of Knowledge Transfer, Innovation & Diffusion

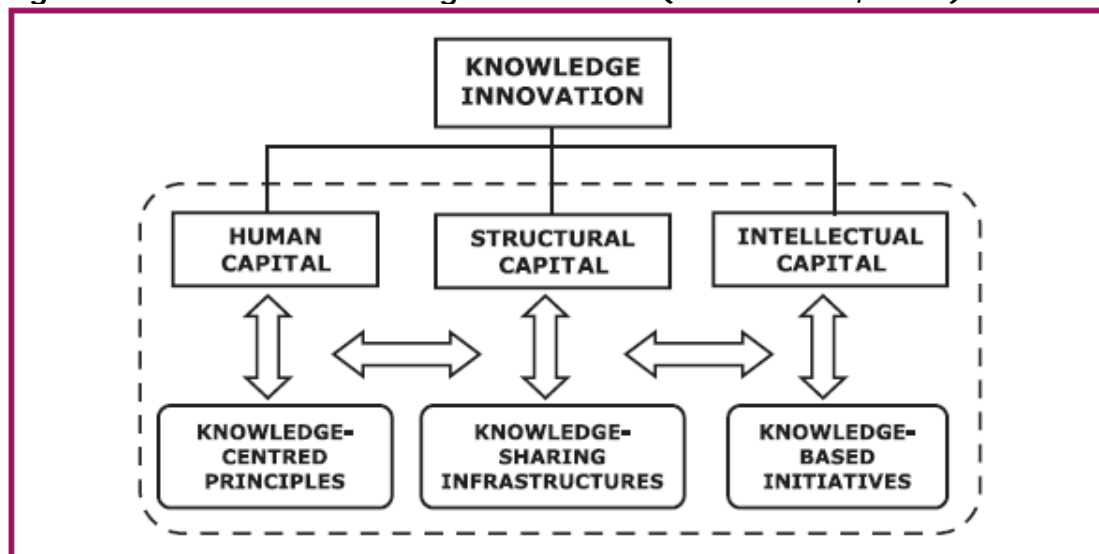
A third of papers in this domain are from the Journal of Knowledge Management which has published a number of integrated frameworks.

Innovation and Positivist KM

Goh (2005) exemplifies the positivist KM and knowledge transfer approach in disseminating an up-beat account of knowledge and innovation and its value to industry. He ties together the concept of knowledge innovation (KI) and KM, and incorporates the need for human and intellectual capital. Principles for KI are summarised as:

1. Innovation thinking: value system versus value chain.
2. Strategy: collaborative knowledge versus competitive innovation.
3. Management: knowledge networks versus business units.
4. Solutions: human technology versus machine-based.
5. Process improvements: bottom-up versus top-down.
6. Customer focus: success.

Figure 16. Model of Knowledge Innovation (Source: Goh, 2005)



Public Sector Organisations & KT

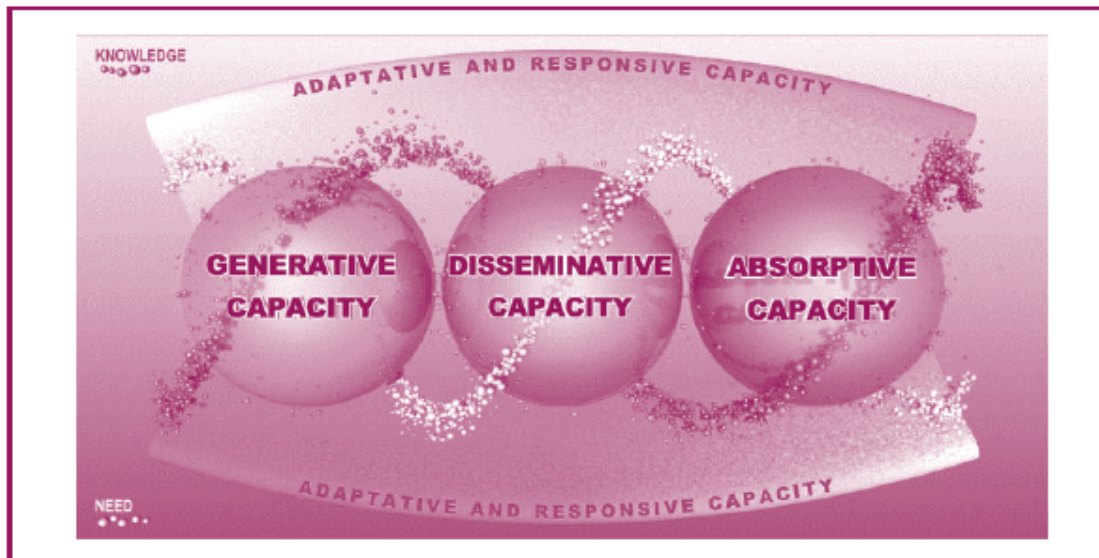
Syed-Ikhsan and Rowland (2004) devised a conceptual framework which they tested against public sector organisations in Malaysia. They tested five variables (organisational culture, organisational structure, technology, human resources and political directives) against creation of knowledge assets and knowledge transfer performance. The relationship with all was positive, excepting those associated with organisational structure (document confidentiality status and communication flow). The general message was that public sector organisations should not just rely on technology.

The Dynamic Knowledge Transfer Capacity Model

Parent *et al* (2007) build up a Dynamic Knowledge Transfer Capacity (DKTC) model based on social construction of reality (Berger and Luckmann, 1966) and systems thinking. "A system is a mental model or mix of parts that interact with each other within the system's boundaries (form, structure, organization) to function" (p84).

'Need' and 'knowledge' are the backbone of the model, wrapped around types of knowledge transfer capacity. Need determines what sort of knowledge is to be transferred. "For example, to say that our society has a problem with the treatment of lung cancer leads us to generate and transfer new knowledge for treating lung cancer (medical interventions). On the other hand, to say that we have a societal problem with nicotine dependence leads us to search for and transfer ways to prevent smoking (social and educational interventions, as well as medical and legal means)" (p86). Knowledge is transferred through the system by a combination of generative capacity, disseminative capacity and absorptive capacity, together with the second order adaptive and responsive capacity.

Figure 17. Model of Dynamic Knowledge Transfer Capacity (Source: Parent *et al*, 2007)



8.2 Measuring the Effectiveness of KM

This section looks at how KM itself has been measured and evaluated, distinguishing between empirical and theoretical studies. It puts knowledge management as a 'good thing' under the spotlight.

8.2.1 Evaluative Frameworks

There is little distinction in the papers between the concept of knowledge and a specific activity called Knowledge Management. For example, use of benchmarks is classified among KM tools.

Linking Knowledge to Performance

There is a problem of attribution in linking performance with knowledge and

value. Yates-Mercer and Bawden (2002) propose the use of a 'balanced scorecard' to give a broad view of the organisation that includes a number of metrics that capture the value of knowledge:

- Knowledge capital – organisational (as opposed to personal) information productivity measures the cost of information management by taking the economic value added (EVA) and dividing it by the cost of information management. Knowledge capital is created when the effects are greater than the costs;
- Intellectual capital/intangible assets – human know-how is not readily measurable;
- Benefits and cost-benefit analysis – intellectual capital can be measured indirectly by looking at performance measures such as cost improvement programmes, productivity improvement, staff morale, customer satisfaction, competitive advantage;
- KM system – intranet and measures of its impact;
- Learning – learning curves.

Literature Review of KM Performance Evaluation

Chen and Chen (2006) undertook a literature review 1995 - 2004. They selected the start date because Nonaka and Takeuchi's influential book appeared in 1995, putting forward the knowledge spiral to corporations. During the subsequent decade, the research trend moved towards "how to measure KM performance". Was the initiative living up to the theory?

There is no universally accepted definition of KM, just as there is no unified view of knowledge. KM activities varied according to the concept of knowledge underpinning them. Evaluation of their performance resorted to methods that matched the knowledge type that was being managed. Eight categories were identified and are summarised here.

- qualitative analysis – Qualitative methods are suited to investigation of tacit knowledge, e.g. expert interviews, critical success factors and questionnaires are used for evaluation of KM.
- quantitative analysis – this is the primary methodology used to evaluate KM performance. It is used to investigate application of initiatives where knowledge is codified, measuring the explicit knowledge of an organisation;
 - financial indicator analysis – return on investment (ROI), net present value (NPV), return of knowledge (ROK), and Tobin's q are methods that are suited to measuring daily transaction processing system values. Investment in IS/IT and databases compared with increase in sales, for example, can be costed using NPV.
 - non-financial indicator analysis – performance appraisal and training is depicted as a form of KM, by retaining knowledge within the company. Smits and Moor (2004) developed a Knowledge Governance Framework for use in communities of practice. It is more usual to measure the impact of knowledge indirectly by measuring company performance through the use of intermediate measures, e.g. number of new products. There is a trend towards greater use of non-financial indicators.
- internal performance analysis – focuses on process efficiency and goal achievement efficiency, e.g. ROI, NPV, balanced scorecard, performance-based evaluation, activity-based evaluation. Firm innovation capability, according to Chen & Chen, is the most important factor in improving product performance and competitive ability.

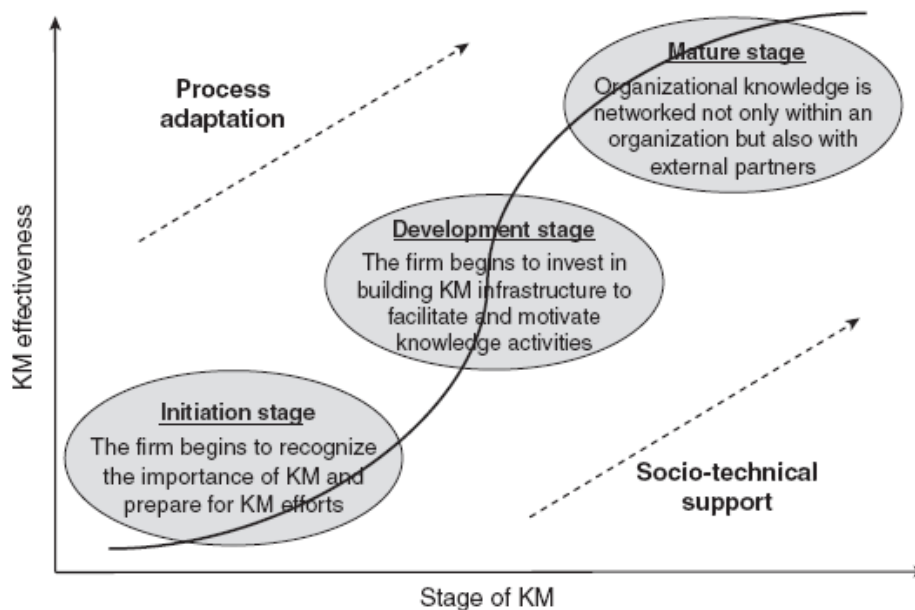
- external performance analysis – Benchmarking and use of best practices are described as forms of KM performance evaluation. They can be interpreted as types of organisational learning;
- project-orientated analysis – KM project management frameworks and models fall under this heading;
- organisation orientated analysis – leadership, cultural, processual, intellectual capital dimensions are considered.

8.2.2 Empirical Studies

Developments over Time – A Stage Model of Knowledge Management

Lin (2007a) uses the work of Gold *et al* (2001) who define four processes in KM: knowledge acquisition, knowledge conversion, knowledge application and knowledge protection. He considers KM effectiveness as an interaction between individual level and organisational level effectiveness, each contributing to the other, and suggests that KM evolves through three stages: initiation, development and maturity. An empirical study surveying 141 Taiwanese executives found support for the propositions that: (1) firms change their KM processes over time to improve KM effectiveness as well as develop their KM practices, (2) socio-technical support results in more mature KM practices, and (3) more mature KM practices are characterised by higher levels of organisational support and IT diffusion. Social factors include changing employee attitudes, top management support and reward systems. Technical factors include IT infrastructure and information security.

Figure 18. Stage Model of Knowledge Management (Source: Lin, 2007a)



The Performance Benefits of Innovation

Bogner and Bansal (2007) found that firms benefit from generating and building on knowledge. They deconstructed the resource-based and knowledge-based view of the firm to test the link between knowledge management and performance by analysing 30,022 patent records from 42 firms. They found that knowledge content and dynamic process were each important, since “sustaining advantage is really the case of sustaining the lead in a never-ending learning race” (p186). There is no final winner. They also found that all firms benefit

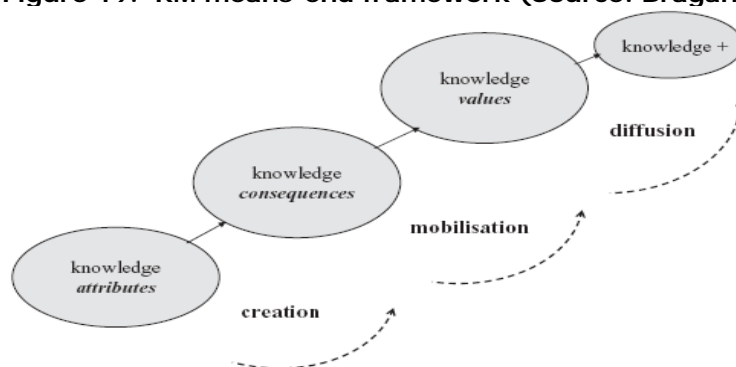
from groundbreaking innovations, rather than being wedded to existing products and resources. Their work was a vote of confidence for spending on R&D since, in spite of uncertainty and time-to-market, it generally raised returns and allowed firms to sustain their lead.

Performance Benefits of KT

Braganza *et al* (2007) used a qualitative case study (semi-structured interviews) to evaluate the adoption of an intranet-based knowledge management system called InTouch within Schlumberger, part of the oilfield services industry. They used a means-end chain as a conceptual framework (below) and found that the system had produced benefits by the following activities:

- Gain tangible business benefits
- Create new form of coordination
- Improved speed and quality of decision making
- Meritocracy of ideas
- Increase job enrichment for employees
- Real-time access to knowledge
- Efficient link between delivery sites and technology centres
- Faster introduction of new products
- Use metrics to adjust to external changes

Figure 19. KM means-end framework (Source: Braganza *et al*, 2007)



8.3 Exemplar Papers

8.3.1 Most Cited – Model of Diffusion and Adoption

Box 18. Abstract from Newell *et al* (2000)

This paper presents a knowledge-focused perspective for the development of a model to explain the diffusion and adoption of complex integrating technologies. Business process re-engineering (BPR) is used as the example to illustrate the model. However, while BPR is used to illustrate our argument, the model that is developed is relevant to understanding the innovation processes surrounding any complex IT-based innovation. It is argued that the strength of this diffusion model is that it focuses not on the spread of particular technological artefacts (whether it is BPR or any other IT-based innovation), but on the spread of the ideas and knowledge underpinning the technology. In particular, the model draws

attention to the ways in which technology suppliers commodify knowledge and present 'packaged' solutions. This creates problems for potential users who need to unpack this knowledge and integrate it with existing organizational knowledge. The diffusion and adoption of innovations is thus seen as a process of integrating knowledge across disparate communities. Such knowledge integration, however, is difficult. This can help to explain the apparent contradiction between the limited success rate of BPR and its widespread diffusion among western firms.

By presenting the innovation process as a knowledge integration problem, Newell *et al* move away from more typical implementation analysis which has 'an inherent pro-innovation bias' and tends to locate the problem with the user. Technology, such as BPR, is pushed by suppliers on the wave of a fashion and it is pulled by users who are actively seeking the product. McNulty (2002) made similar observations about demand for BPR, and the 'distance' and 'editing' perspective of Morris and Lancaster (2006) has explanatory value here (both discussed in the previous chapter on Barriers & OD). Newell *et al* argue that technology suppliers have a vested interest in editing down or bundling ideas, so that they can be hired to unbundle them for implementation, e.g. through process analysis, change management of IS/IT skills.

8.3.2 Interesting – Integrated Model

Parent *et al* (2007) give an up-to-date account of theory (included earlier in this chapter) and build a dynamic, integrated model which satisfies Rubenstein-Montano *et al*'s (2001) call for coherent frameworks in KM.

Box 19. Abstract from Parent, Roy and St-Jaques (2007)

Purpose – The purpose of this paper is twofold: to understand how recent developments in systems thinking and social construction can influence understanding of knowledge transfer (KT); and to propose a new systems-based knowledge transfer model.

Design/methodology/approach – The paper is a review of the literature on knowledge transfer, systems thinking and social construction leads to the proposal of a new KT paradigm.

Findings – The Dynamic Knowledge Transfer Capacity model (DKTC) found in this paper identifies the components required for social systems to generate, disseminate and use new knowledge to meet their needs. The model includes pre-existing conditions, (need and prior knowledge) and four categories of capacities (generative, disseminative, absorptive and adaptive/responsive) that social systems must possess for KT to take place.

Research limitations/implications – The paper shows that the DKTC model is particularly well suited to analyzing complex systems with multiple stakeholders as opposed to small-scale knowledge transfer systems. Empirical analysis in complex systems environments will help verify, enrich and generalize the model.

Practical implications – The paper sees that in an increasingly knowledge-based economy, the ability to base decisions on the latest knowledge is vital for the success of organizations. The capacity for effective and sustained exchange between a system's stakeholders (researchers, government, practitioners, etc.); exchanges characterized by significant interactions reflected within the DKTC model, results in the appropriate use of the most recent discoveries in the decision making process.

Originality/value – The paper proposes a new knowledge transfer paradigm that views knowledge as a systemic, socially constructed, context-specific representation of reality. The proposed knowledge transfer model is in sharp contrast to past attempts, focusing attention on the capacities that must be present in organizations and social systems as a precondition for knowledge transfer to occur.

9. Organisational Learning (Phase 1 Management Literature)

Organisational Learning (OL) is an emergent field of study (Nutley *et al*, 2007, p163). It does not encompass a unified theory but draws on disciplines of human resources, social and cognitive psychology and organisational studies. Learning in an organisation may be described as 'a process by which an organisation gathers and uses new knowledge, with appropriate consideration for the tools, behaviours, and values at all levels. Newly learned knowledge is translated into new goals, procedures, roles and performance measures" (Lehaney *et al*, 2004, p23).

The organisational learning approach characterises the organisation as more than a sum of individuals, but as something that may mature or develop under specific conditions. It marks a process of change, adaptation and improvement to remain viable (Lehr & Rice, 2002). The OL approach highlights the importance of distributing and organising knowledge for re-use later.

This chapter considers different types of knowledge and then outlines three units of analysis:

- Organisation: Knowledge sought by the organisation to gain competitive advantage or to achieve future targets and goals (strategic learning; dynamic capability; knowledge internal to the organisation's experience; sensemaking);
- Group: Knowledge generated by groups, e.g. communities of practice, perhaps through networks (organisational form);
- Individual: Knowledge of individuals circumscribed by cognition.

9.1 Types of Knowledge from OL Perspective

Chapter 5 was dedicated to the nature of knowledge and knowing. Further refinements are considered here in the context of OL. Researchers have put forward polarities as a way of conceptualizing knowledge and its acquisition through learning.

Cognitivist and Constructivist

Spender (2008) suggests that learning theory has developed in two directions: cognitivism and constructivism, seeing the brain as a computer on the one hand and as an inquiry into 'why we cognize as we do' on the other. The distinction is relevant to going beyond thinking about organisations as exploiters of specialist knowledge towards organisations as apparatus for managing creation of knowledge.

Social and Technical Activity

Knowledge sharing is characterised as either a social or technical activity (Matsuo & Easterby-Smith, 2008). Experiential learning and use of IS/IT is conventionally polarised, but the use of data to inform learning has an explicit role in models of planned or strategic learning.

Intentional and Experiential?

Learning may be construed as intentional within a strategic objective, and it may

also be serendipitous and a by-product of experience. Thomas *et al* (2001) bring strategic learning into focus.

Auto-poiesis

Chive and Alegre (2005) try to integrate organisational learning and organisational knowledge by drawing connections between individuals and organisations and social processes and organizations. They find a bridge between organisational learning and organisational knowledge using 'auto-poiesis' theory, expounded by Maturana and Varela (1980, 1992). They are Chilean biologists who suggest that knowledge is the act of creating a world which is unique to each of us. Perceptions are at work at both the individual and at the social level.

Micro and Macro

Lam (2000) integrates micro level learning activities with organisational forms and also with macro-level institutions in education, training, labour markets and careers. She builds up a typology which is described later in this chapter.

9.2 The Organisation

Organisational Learning (OL) and the Learning Organisation (LO), according to Easterby-Smith & Lyles (2003) (reviewed by Gourlay, 2004), are terms that are used consistently to describe: learning in organisational contexts (OL); and an aspiration or normative model (LO).

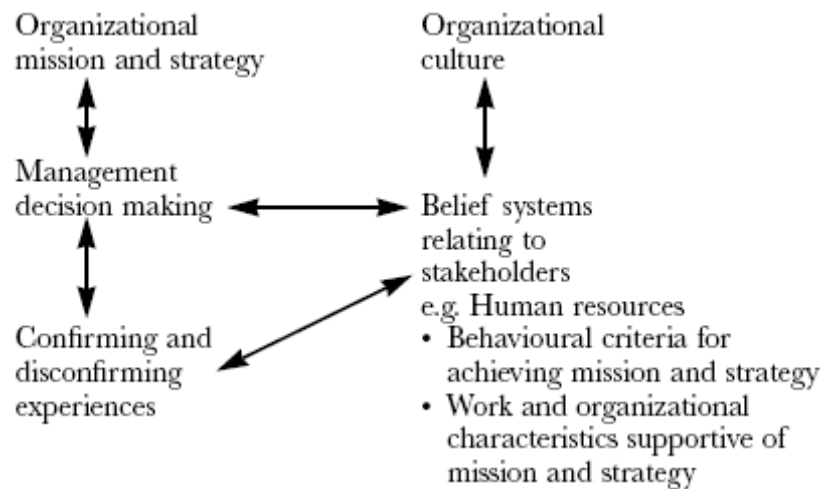
Absorptive capacity refers to an organisation's effectiveness at learning and acquiring new knowledge (Inkpen, 2000). It requires effort, not just exposure, and is an organisational process that needs to be managed. 'Knowledge connections' can facilitate learning, based on informal and formal initiatives such as 'technological gatekeepers' (Katz and Tuschman, 1980) and transfer groups (Katz and Allen, 1988). Transfer of knowledge is eased by its relatedness, or connection with prior knowledge – what one can learn is influenced by what one already knows, although Inkpen acknowledges that the novelty of unrelated information may paradoxically enhance absorption.

9.2.1 Planned and Unplanned Learning

Using Belief Systems and Culture

Williams (2001) sets out a model to capture the process of organisational learning, to mitigate the confusion caused by attributing learning to organisations. His model draws on tacit knowledge, role-modelling, sensemaking, memory, culture and motivation as components that build belief systems within organisations. Learning, whether planned or unplanned, involves reinforcement or challenges to belief systems which have a feedback loop to management decision-making. Williams states that "objective evidence of organisational learning occurs when management decisions (and their implementation) reflect consistent beliefs over time" (p79), and also suggests that sound measures for assessing beliefs and culture are needed. Planned learning is distinct from unplanned or emergent learning, indicating that OL can only be partially managed.

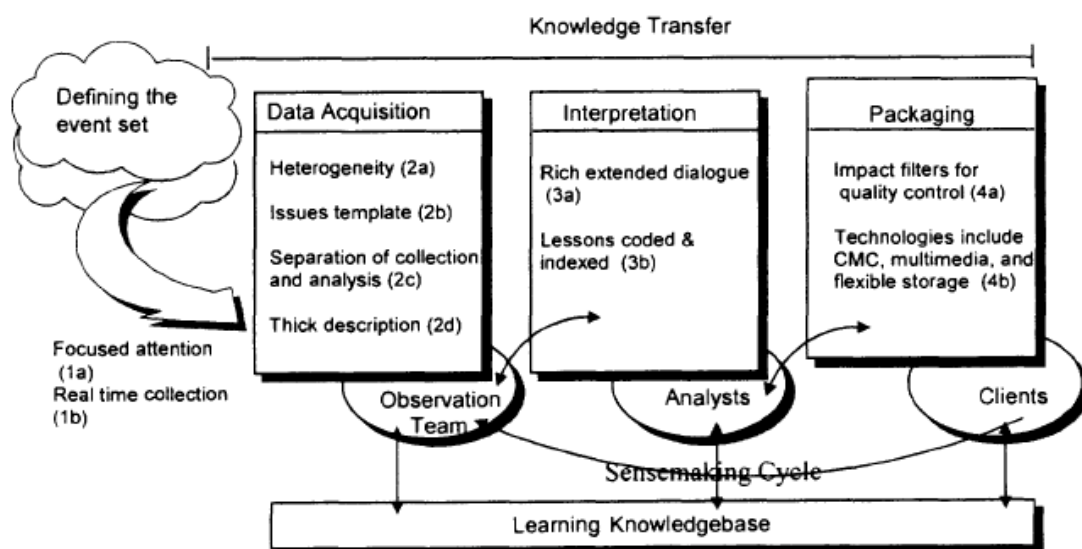
Figure 20. A model for conceptualizing the process of organizational learning (Source: Williams, 2001, p73)



Strategic Learning – Knowledge Sought by the Organisation

Strategic learning is planned organisational learning, generated deliberately to support strategic goals of the organisation in order to gain a performance advantage, with some notion of forward purpose. It is linked simultaneously to 'sensemaking' (Weick, 1995, Thomas *et al*, 1997) and is interactive over time since "strategic learning organisations enact meaning from new, ambiguous experiences and develop shared understanding of both current and future events" (Thomas *et al*, 2001, p332).

Figure 21. Model of Strategic Learning (Source: Thomas *et al*, 2001)



Thomas *et al* (2001) use a case study of intentional learning, which they term 'strategic learning', based on the Center for Army Lessons Learned (CALL) in Kansas. The US Army former Chief of Staff was quoted: "We don't need more information, we need knowledge targets on strategically important issues. That is what CALL did for us". Thomas *et al* describe the intentional nature of the CALL which 'is used incisively – as a scalpel – to carve out learnings from only those processes that represent strategic opportunity" (p342).

Experiential learning, conversion of tacit to corporate declarative knowledge, features through a process of 'strategic knowledge distillation'. Visual media, where a picture is worth a thousand words, played a role, e.g. where soldiers watched videos of complex situations, imagined best possible actions and mentally rehearsed future tacit experiences. Use of external data collectors is also believed to be important, rather than using internal data collectors, because of the objectivity they can bring to bear. There is a tension here, though, with the knowledge of local content and ambiguity that local people can bring to bear. Thomas *et al* argue that a theoretical understanding needs to be made of this sense-making paradox.

9.2.2 Strategic Alliances

Learning in Strategic Alliances

"Strategic alliances provide an ideal platform for learning", according to Inkpen and Pien (2006, p780). They argue that strategic alliance formation is motivated at least in part – or sometimes entirely - by the aim of learning from strategic partners. There are six dimensions to learning between alliance partners:

- Knowledge tacitness – where learning is context-specific and often happens by doing rather than articulating
- Knowledge relatedness and knowledge differences – where learning is linked to what we already know
- Knowledge connections – where learning happens through managerial and other relationships
- Partner relationship and openness – where learning is encouraged through trust
- Partner skill differences as an antecedent to learning – where learning opportunities arise through complementarity rather than sameness
- Performance and outputs of learning alliances – where learning is the basis for partner value creation by enhancing performance

Inkpen and Pien undertook an empirical case study to test these assertions. They found that in the early years the partners were competitive, so that transfer of tacit knowledge stalled while one of the partners appropriated explicit knowledge and copied it. Partner relationships were impaired and the strategic alliance did not survive intact.

Unlearning in Strategic Alliances

The term 'learning' has positive connotations but, as well as being costly to pursue, Inkpen (2000) notes that it is possible to learn incorrectly ('mis-learn' in today's speak) or to learn correctly that which is incorrect, being misinformed (Huber, 1991, p3). In either case, outcomes can be unsatisfactory and pose a risk to the organisation.

Tsang (2008) identifies 'unlearning' as a gap in organisational literature (Hedberg, 1981) since it has received little empirical study and helps in understanding 'stickiness' in knowledge transfer (Szulanski 1996). He studied a Sino-foreign joint venture, and examined how issues of organisational unlearning in this single case study differed from those of organisational learning (Szulanski, 2000), summarised below. An important limitation of the work, acknowledged by Tsang, is absence of the political dimension of knowledge transfer, since stickiness might originate from political resistance by Chinese partners to adopt foreign routines.

Table 10. Learning and Unlearning (Source: Tsang, 2008)

Stages of knowledge transfer	Organizational learning (Szulanski, 2000)	Organizational unlearning (this study)
Initiation	Recognizing opportunities to transfer routines and acting upon them	Convincing the recipient that the transfer of certain routines is necessary
Implementation	Bridging the communications gap between the source and recipient, filling the recipient's technical gap and improving coordination between the source and recipient	Establishing the legitimacy of a new routine, failure of which may result in the recipient's reluctance to accept the ostensive aspect of the new routine
Ramp-up	Resolving unexpected problems arising from using the new routine	Recipient continuing to enact the old routine although it has been replaced by the new one
Integration	Removing obstacles and dealing with challenges related to the institutionalization of the new routine	Recipient's tendency to revert to the old routine, making institutionalization of the new one difficult

9.3 Groups

The social constructionist perspective challenges the notion that knowledge starts in the heads of individuals. It starts from the assumption that learning occurs through interaction between people (Easterby-Smith, 2000) through situated learning. The idea of communities of practice signifies a shift from epistemology of possession of knowledge to epistemology of practice of knowledge (Cook and Brown, 1999, in Easterby-Smith, 2000, p788).

Figure 22. Types of background assumptions and the relation to explicit theories (Source: Schulz, 2008, p461)

Background assumptions			Explications	
Theory in use (Argyris/Schön)	Local theory (Baitsch)		Espoused theory (Argyris/Schön)	Materialization (Baitsch)
– tacit knowledge – experiences	– general understandings, values	<i>partial</i> explication through conscious reflection or through ongoing practising <i>partial and unconscious</i> integration in background assumptions through practising	– explanation of action – general knowledge	– values – general understandings
developed through experience and intuition	developed through long-term enculturation processes		generated through conscious analyses of activity	manifestation of local theory through ongoing practising
– stable but change able through changed work conditions	– high stability – far reaching – responsible for cohesion and distinction of communities		– stable but change able through conscious processes	– high stability through long-term manifestations
tacit, unconscious, non-transparent, context related			explicit, transparent, abstract, generally accessible	

Schulz (2008) develops a theoretical framework of shared knowledge and understanding among groups in organisations, building on actor and activity theoretical views. Engestrom's (2001) theory of expansive learning, where background assumptions are important, is fused with Argyris and Schon's concept of "theory in use" (1978, 1996) and 'local theory' developed by Baitsch (1993, 1996). The model is summarised above.

9.4 Individuals

Cognitive models start with the individual and are generally set at odds with knowing-as-practice or situated learning which depends on interaction with others. Recent literature is trying to slough off the monadic nature of individualist cognition (e.g. Ringberg and Reihlen, 2008, discussed below). Marshall (2008) examines the individualist-social typology, based on cognitive-community (Swan *et al* (1999) and possession-practice (Cook and Brown, 1999) distinctions of knowledge and learning. He tries to dissolve the dualist distinction, suggesting it is overplayed.

9.4.1 Models of Learning

Single Loop and Double Loop Learning

The distinction between single loop and double loop learning (originally Argyris, 1976) is now used as a short-hand to describe routine and radical ways of learning (Easterby-Smith, 2000). Lehr & Rice (2002) outlines the role of single loop as corrective action or adaptive learning and double loop as modification of underlying processes or generative learning. Triple loop learning occurs when an organisation questions not just what it has learned but the way it has learned it.

Unlearning

Double loop learning is particularly important in the long term and in times of change, since "what an organization learns at any one time may become irrelevant or even harmful under different conditions or at a different time" (Lehr & Rice, 2002, p1064). Unlearning is necessary. Easterby-Smith (2000) suggests that 'unlearning' is used as a casting off process.

Sensible Knowledge and Practice Based Learning

Strati (2007) introduces knowing with the hands, with the feet and with the ear. 'With the hands' or 'interpretation by touch' was studied in a saw mill. 'With the feet' was studied among roofers who needed to feel the roof with their feet. 'With the ear' was discussed in relation to a busker who sounded pleasant at first and then tormenting to secretaries working in a nearby office who heard the same tune over and over. Strati's perspective is unique in the management literature in shifting attention away from cognitive processes towards perceptive-sensory faculties and aesthetics.

The Psychosocial Filter

Andrews and Delahaye (2000) identify a cluster of micro-processes that are highly influential in organisational learning. They start with the individual and perceptions of approachability, credibility and trustworthiness. Scientists in a bio-medical consortium used these psychosocial filters to refine their knowledge seeking and knowledge importing behaviour, working out who to ask. The filters

also mediated their knowledge sharing activities. They would choose to disclose information to people that they thought would use it with integrity.

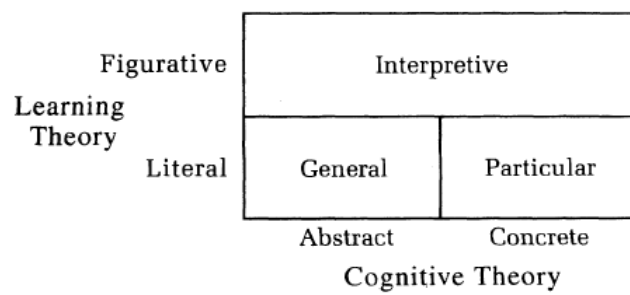
9.4.2 Knowledge Representations and Knowledge Transfer

Boland, Singh *et al* (2001) draw upon cognitive and educational psychology to set up a cognitive and learning framework based on the following premises:

- There is a distinction between abstract and concrete cognitive functioning;
- There is a distinction between literal and figurative (symbolic) ways of learning, and knowledge is a function of figurative learning such as narrative, metaphor, sense-making or interpretation of ambiguity.

They cross-tabulate these dimensions to produce a typology of knowledge representation based on cognition and learning:

Figure 23. (Source Boland, Singh *et al*, 2001)
Typology of Knowledge Representation Based on
Theories of Cognition and Learning



Boland, Singh *et al* (2001) use the notion of schemata, previously formed mental templates used to interpret events, to test whether managers were pragmatists or theorists. They had an *a priori* view that figurative abstract knowledge was of a higher form than concrete and literal ways of knowing, but experimental work suggested that decision-making was stimulated more effectively by concrete and unambiguous representations of knowledge.

9.4.3 Intrinsic and Extrinsic Motivation

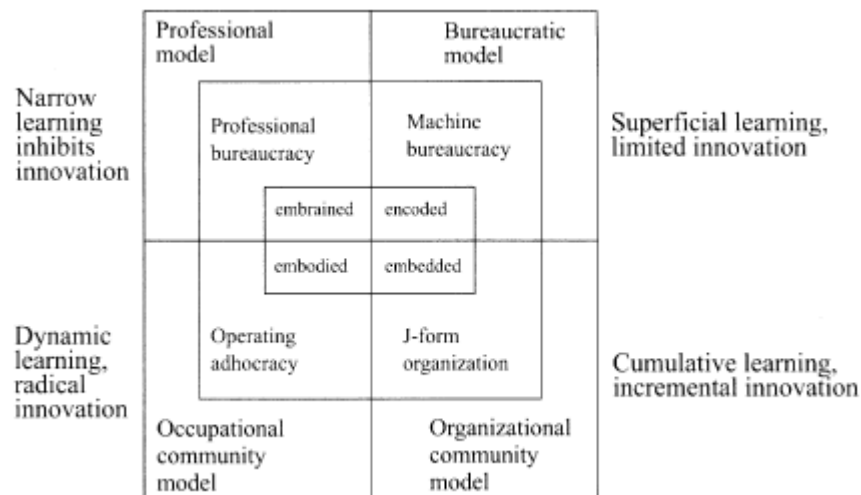
Psychological theories of motivation have been applied by Lin (2007b) to study the effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions. He integrates a motivational perspective into the theory of reasoned action (TRA) where extrinsic motivation to share knowledge is instrumental, referring to 'expected organisational rewards and reciprocal benefits' and intrinsic is spontaneous "knowledge self-efficacy and enjoyment in helping others." TRA (Fishbein and Ajzen, 1975) asserts that individual beliefs and attitudes explain most human behaviours and is used to predict and explain behaviour. He found that organisational rewards secured only temporary compliance. Reciprocal relationships are more important and long lasting in their impact on knowledge sharing. Knowledge self-efficacy is found to be an important antecedent to employee knowledge sharing attitudes and intentions. Lin concludes that 'a highly self-efficacious staff can be established by recruiting and selecting employees who are proactive, and who have high cognitive aptitude and self-esteem and are intrinsically motivated' (p145). Enjoyment in helping others is an influential positive factor so, it is argued, managers should focus on 'enhancing the positive mood state' to encourage greater interactivity.

9.5 Integrative Frameworks

9.5.1 Tacit Knowledge, OL and Societal Institutions

The most highly cited and carefully theorised integrative framework is put forward by Lam (2000), schematised in the figure below.

Figure 24. Framework Integrating OL and Organisational Form (Source: Lam, 2000)



The firm's knowledge is analysed along two dimensions: epistemological (tacit-explicit) and ontological (individual-collective). They give rise to four types of organisational knowledge, described as embrained, embodied, encoded and embedded. Lam notes that while "it is possible to distinguish conceptually between explicit and tacit knowledge, they are not separate and discrete in practice" (p490). The two types interact and combine to generate new knowledge (Nonaka and Takeuchi, 1995), driving the learning and innovative capability of the firm.

Organisational form (considered further in Chapter 10) is mapped to type of labour market and education:

- The professional model requires formalised knowledge based on a specialist, elitist education;
- The bureaucratic model relies on formal education within an internal labour market and career hierarchy;
- The occupational community model is a region-based occupational labour market, with inter-firm mobility, e.g. Silicon Valley where firms and expertise are co-located;
- The organisational community model uses a broad-based education system and an internal labour market with broadly defined jobs, e.g. the J-form found in Japan.

The model is used to contrast four societal models and their ability to create organisational relationships to harness tacit knowledge. Community models operating communities of practice are good while bureaucracies using hierarchy are bad in this respect. The framework offers a way of considering 'societal strategic advantage' (Sorge, 1991; Biggart and Orru, 1997) and for analysing the 'learning economy' at a national level.

9.5.2 Socio-Cognitive Approach to Knowledge Transfer

Ringberg and Reihlen (2008) critique the dominant research streams of positivism (underlying the resource based view of the firm) and social constructionism (underlying practice-based-knowledge) in which texts and practices are assumed to contain within them coded keys that can be unlocked to allow smooth knowledge transfer. A socio-cognitive approach, by contrast, suggests that meaning is mediated by private and cultural models generated by individuals' own cognitive dispositions, including memory and emotions, as well as socio-cultural interaction. Knowledge transfer is therefore tentative. They set out a socio-cognitive model showing links between context, process, feedback and outcome.

Figure 25. Cognitive outcomes in knowledge transfer (Source: Ringberg & Reihlen, 2008, p920)

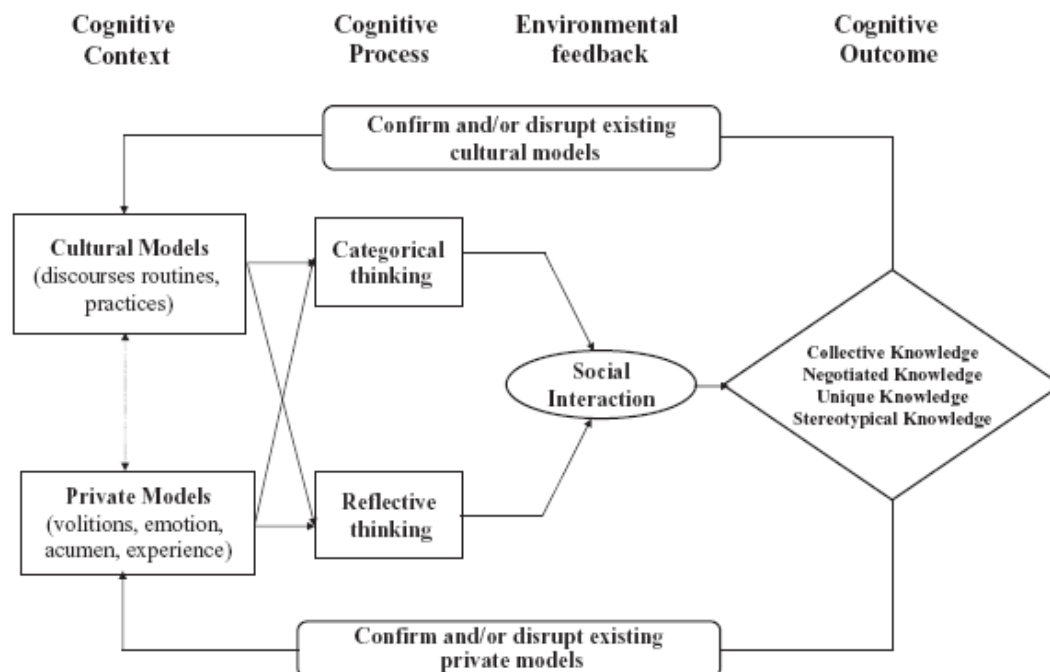
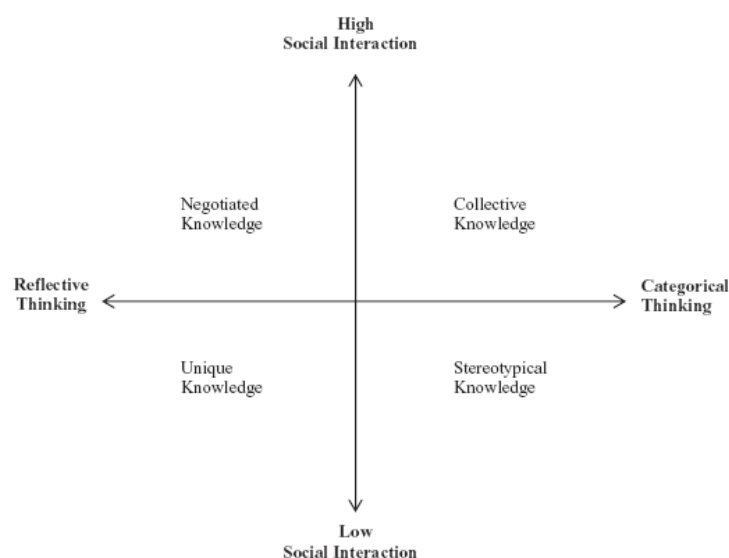


Figure 26. Knowledge transfer outcomes (Source: Ringberg & Reihlen, 2008, p928)

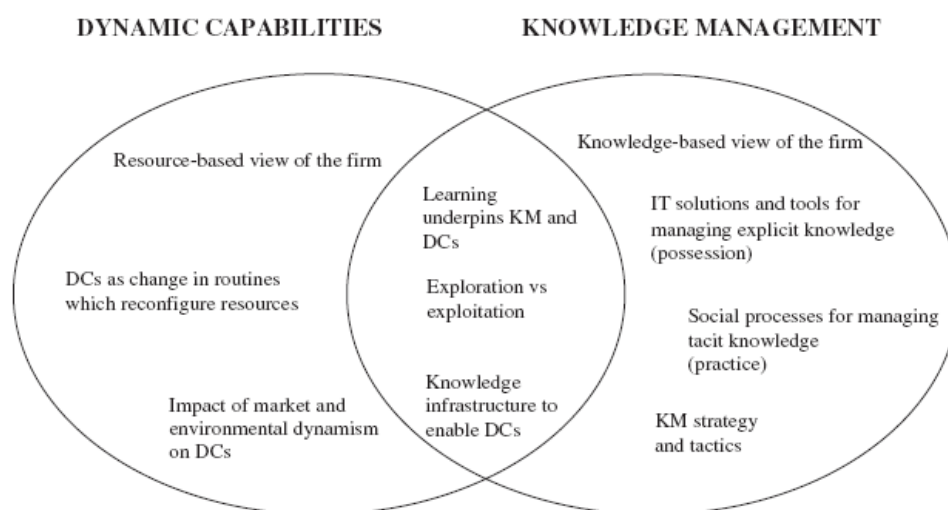


Ringberg and Reihlen also use a bipolar typology (above), a typical structure in psychology, along axes of high-low social interaction and reflective-categorical thinking. The intersection of these constructs produces quadrants of knowledge transfer outcomes: negotiated knowledge, unique knowledge (combining reflective thinking with low social interaction: “such persons may be considered socially inept, extreme idealists, or even nerds” (p926), collective knowledge and stereotypical knowledge. The managerial challenge is to match knowledge transfer types with the needs of the organisation.

9.5.3 Linking Dynamic Capabilities with KM and OL

Easterby-Smith and Prieto (2006) introduce ‘dynamic capabilities’ and ‘knowledge management’ as common terms within the strategic management literature, looking at “how best to manage organisations in dynamic and discontinuous environments” (p235) by building and sustaining competitive advantage (e.g. Eisenhardt and Martin, 2000; Teece, Pisano and Shuen, 1997; Grant, 1996a). The authors look at the two constructs separately and give a theoretical account that explicitly links them.

Figure 27. Boundaries and overlaps between the DC and KM fields
(Source: Easterby-Smith and Prieto, 2006, p240)

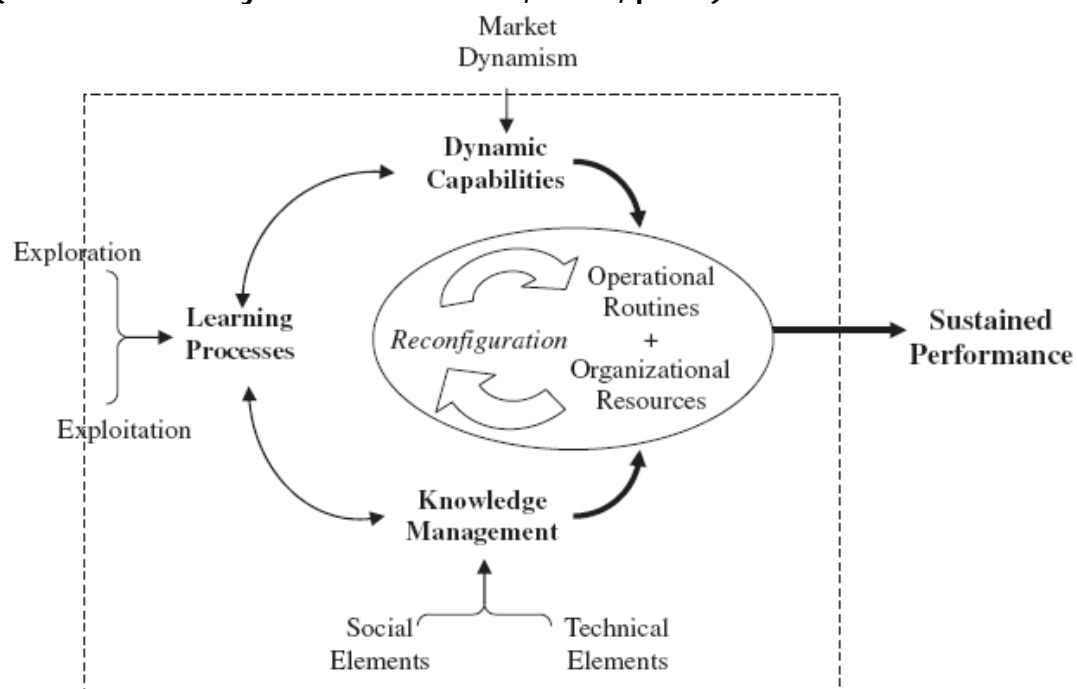


Teece *et al* (1997) led the research stream into dynamic capability within strategic management literature. The concept tends to be located within the resource based view of the firm but, unlike RBV, it is not static and is able to accommodate change over time: “dynamic capabilities are the firm’s ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments” (Teece, Pisano and Shuen, 1997, p. 516; in Easterby-Smith and Prieto, 2006, p237). Organisational learning is one of the processes that leads to improved performance and innovation through development of new products.

Learning has been conceptualised into the firm structure by Winter (2003) and Collis (1994) “by differentiating a capability hierarchy in which operational (zero-level), dynamic (first-order) and learning (second-order) capabilities are intrinsically linked to one another. Operational capabilities or routines are geared towards the operational functioning of the organization; dynamic capabilities are dedicated to the modification of operational routines; finally, learning capabilities facilitate the creation and modification of dynamic capabilities” (p237). Semantics

indicate that "learning itself may be considered as a 'second-order' dynamic capability" (p237) which involves exploitation of existing and exploration of new routines or capabilities.

The authors link knowledge change and adaptation with learning, noting that “knowledge management can be considered as ‘managed learning’ within organisations”; and that “both dynamic capabilities and knowledge management researchers have identified knowledge resources that are critical to achieving and sustaining competitiveness (Tidd, Bessant and Pavitt, 1997)” (p242). They use these links to create an integrative framework, summarised above in which KM is a first-order capability and learning mediates between KM and DC. Competitive advantage comes from reconfiguration of resources and routines, which are the visible outcomes of dynamic capabilities.

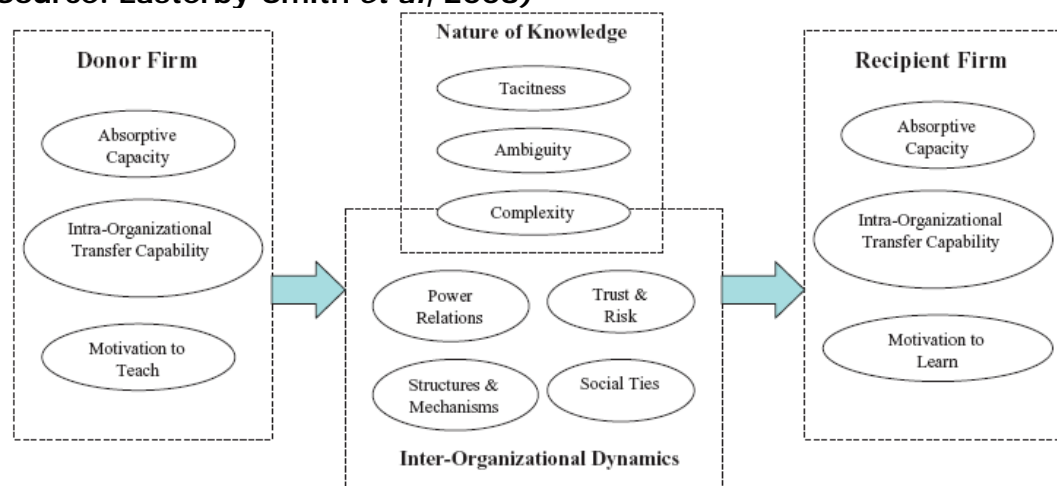


The models outlined above provide an empirical agenda that involves operationalising their constituent elements, e.g. the relationship between dynamic capabilities and knowledge, together with the role of knowledge management infrastructures; the contingency aspect of technical vs. social or exploration vs. exploitation in trading off approaches.

Based on the model figured below, Easterby-Smith *et al* (2008) identify promising areas for future research:

- The role of boundaries, e.g. organisational, national and industrial cluster
- The relationship between inter and intra-organisational knowledge transfer, e.g. national cultural differences are more pronounced in intra-firm knowledge transfer, but power relationships matter more in inter-firm transfer (Van Wijk, 2008);
- Qualitative methods provide better description and lead to fuller understanding of how things change over time or topics such as the role of culture, but quantitative methods are considered to be better at measuring change at a single point in time or topics such as co-operation vs. competition. Easterby-Smith *et al* recommend the application of mixed methods to gain the best of each.

Figure 29. Factors influencing inter-organisational knowledge transfer (Source: Easterby-Smith *et al*, 2008)



9.6 Exemplar Papers

9.6.1 Most Cited – Integrated Framework

Lam integrates three major strands of literature under the umbrella concept of “social embeddedness” (Granovetter, 1985). First is the theory of knowledge and organisational learning drawing on the tacit-explicit epistemology of Polanyi (1962, 1966), Nelson and Winter (1982), Spender (1996a, 1996b) and Nonaka (1994). Second is the theory of the resource- or knowledge-based view of the firm, following Penrose (1959), where the firm is a body of knowledge resources that sets the context for learning (Nelson and Winter, 1982; Kogut and Zander 1992, 1996; Fransman, 1995), and where the role of the firm is integration and creation of knowledge (Spender 1996a; Grant 1996; Tsouakas, 1996). Third is the societal approach of industrial sociology, in which “external societal institutions interact with internal organizational structures and processes to generate societally distinctive organizational forms” (e.g. Maurice *et al*, 1986). The link between national institutions at the macro level and performance of firms and economies is considered, described as ‘national innovation systems’ (e.g. Freeman, 1995; Nelson, 1993).

Lam’s contribution is to draw a link between micro, meso and macro levels. She is the only author in the literature to have attempted to do this. In general, as she points out, general management literature does not concern itself with the

macro, and she exhorts researchers to do more work in this area. The health sector, by contrast, is heavily invested in the macro perspective as it sits within the policy arena.

Box 20. Abstract from Lam (2000)

The importance of tacit knowledge in organizational learning and innovation has become the focus of considerable attention in the recent literature. Our understanding of the nature of the links between tacit knowledge and organizational learning, however, has been hampered by the lack of a conceptual framework integrating micro-level learning activities with organizational forms and macro-level societal institutions. This paper seeks to achieve such an integrative task. It argues that there is an interactive relationship between dominant knowledge types and organizational forms. Further, the extent to which tacit knowledge constitutes the knowledge base of the firm, and how it is formed and used are powerfully shaped by the broader institutional context. The paper develops a four-fold typology at the cognitive, organizational and societal levels, as an analytical framework to explain the links between knowledge types, organizational forms and societal institutions. It shows how the three levels interact to shape the learning and innovative capabilities of firms. The theory developed in this paper represents the first attempt to integrate the diverse strands of literature and different levels of analysis into a single coherent framework.

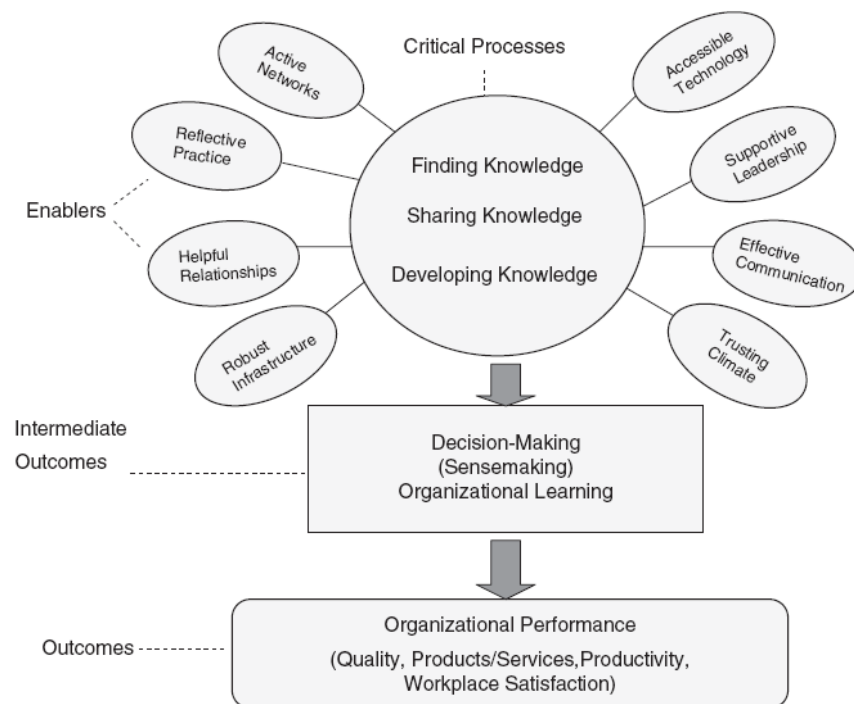
9.6.2 Interesting - Model based on Health Care

Box 21. Abstract from Orzano *et al* (2008)

Improving health care delivery is a pressing societal goal, and information scientists have a role in effecting change. Information science research has led to understanding theories and practices of information use within the informing professions, but information science and none of its subspecialties, Knowledge Management (KM), also have the potential to influence and enhance other professional disciplines. This concept paper makes the argument that KM is a beneficial framework to help health care clinicians manage their practices and ultimately administer quality care to their patients. The central argument is predicated on the assumption that medicine is a knowledge-based profession and that finding, sharing, and developing clinicians' knowledge is necessary for effective primary health care practice. The authors take the case that in an environment of a burgeoning body of health care research and the adoption of technology tools, physicians can benefit from understanding effective KM practice. The model as presented here borrows from recent information science scholarship in KM and is intended to inform intervention protocols for effective KM to improve quality of care.

Orzano *et al* set out a comprehensive inventory of disciplines (e.g. education, engineering and computer science, quality movement, communication, philosophy, psychology, sociology, library and information, economics, strategic management, HR management, organisational science, and consultancy practice) cross-tabulated against key KM themes and notable authors who have contributed. The article is a useful resource. As a model for general practice the authors apply the theoretical context to generate a model linking individual to organisational learning and performance.

Figure 30. "A Knowledge Management Model: Implications for Enhancing Quality in Health Care"



10. Organisational Form (Phase 1 Management Literature)

Knowledge mobilisation may be dependent upon organisational form. Strategic alliances, structure of the organisation (or firm), nature of markets, hierarchies and networks are all variations in form that have been explored in relation to the use of knowledge. We have identified a domain, 'organisational form', where the organisation and its configuration is the unit of analysis.

The connection between organisational form and knowledge mobilisation is the focus of interest here. Relationships and issues of trust, as a requirement for creating and transferring knowledge at the interstices or boundaries of organisations, are attracting increasing interest in the literature.

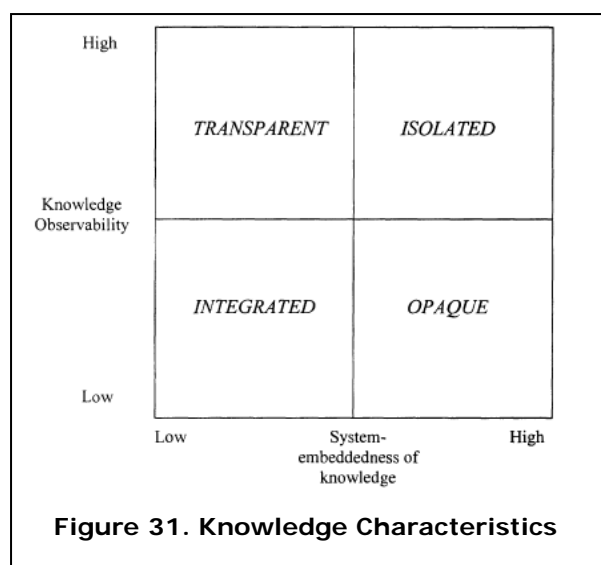
10.1 Types of Knowledge

Epistemology matters (Nonaka *et al*, 2006), so it is worth considering here some contributions from theorists who have tried to link knowledge to organisational form.

10.1.1 Organisational Knowledge

Organisational knowledge is defined as "the capacity for action" (Inkpen, 2000). It is difficult to codify and, being 'sticky', often hard to transfer. Knowledge management is about sharing, embedding and transferring knowledge across the organisation, with the ultimate objective of "creation of new knowledge and innovations that can be deployed in the market-place as the foundation for competitive advantage" (p1020), consistent with the resource based view of the firm where knowledge has value (Teece, 1998). Tsoukas and Vladimirou (2001) emphasise the conversion of personal knowledge into rules and routines, converting individual knowledge into organisational knowledge.

Predictor of Structure?



Birkinshaw *et al* (2002) ask "Do Characteristics of Knowledge Predict Organisation Structure?" They build on thinking about dimensions of knowledge assets (Winter, 1987; Zander and Kogut, 1995) and, specifically, on observability and embeddedness, within an R&D unit. They find that there are four generic forms that a firm's knowledge might take: integrated, isolated, opaque and transparent. These forms are predictive of organisational structure, e.g. units with 'isolated' knowledge are more likely to be autonomous and less integrated; units with integrated knowledge

have less autonomy; opaque knowledge is not easily transferred; forms with transparent knowledge are context-neutral.

10.1.2 Knowledge at Boundaries

Knowledge boundaries (Carlile, 2002) may be described as syntactic, semantic and pragmatic. The syntactic approach started with a mathematical theory of communication, where information could be codified, for example in binary form (Shannon and Weaver, 1949). Systems theorists were stimulated to think of the boundary between organisation and environment as an information processing problem (e.g. Bertalanffy, 1956; Ashby, 1956; Buckley, 1968). Work by Lawrence and Lorsch (1967) and Galbraith (1973) on information exchange and differentiation added refinement, allowing syntax and information processing to become the dominant boundary spanning theory in organisational research (Brown and Eisenhardt, 1995). "More is better" is the message, in terms of information, communication, team strategies, where knowledge differences exist between boundaries.

The semantic approach allows for interpretive differences (Redding, 1972; Reddy, 1979) and addresses problems of novelty, where new knowledge is needed and old syntax is not adequate – for example, when volume of products to be manufactured outstrips anything that has happened before. The notion of tacit versus explicit knowledge (Polanyi, 1966; Leonard- Barton 1995; von Hippel and Tyre, 1996; Nonaka and Takeuchi 1995) draws attention to the distinction between syntactic and semantic knowledge, and the theory of communities of practice suggests that individuals will work through semantic differences by converting tacit to explicit knowledge across a boundary (Nonaka, 1994).

The pragmatic approach, rooted in the philosophies of Peirce (1898) and James (1907), addresses consequences of dependencies, i.e. why things matter, where both difference and novelty exist. Knowledge is altered, created and validated in the pragmatic process of 'transforming' knowledge (Carlile, 1997) which can be applied to innovation and prototypes (Schrage, 1999; Iansiti, 2000).

The community of practice literature (Lave and Wenger, 1991; Brown and Duguid, 1991; Orr, 1996) describes the 'purposive' nature of knowledge, where individuals share a problem and its consequences, and the semantic nature of tacit knowledge. Carlile (2002) states that knowledge is 'localised, embedded and invested in practice' (p445), which is useful for solving problems within a practice, but 'problematic when working across practices' (p446).

10.2 Types of Organisational Form

"Hierarchal structures hinder timely communication and decelerate knowledge sharing. Flat structure is the best facility for knowledge sharing" (an employee interviewed in a study by Al-Alawi *et al*, 2007, p38)

10.2.1 Markets, Hierarchies and Communities

Reflecting on reorganisation in the US over the previous two decades where large hierarchical firms appeared to be replaced by small firms, Adler (2001) uses economic analysis to describe three types of structure: market, hierarchy and community, each with their own distinct co-ordinating mechanisms of price, authority and trust. He sets out a typology of organisational forms or 'modes':

- Hierarchy concentrates knowledge in specialist units and uses authority to manage horizontal and vertical division of labour. This type of organisation is

efficient in routine tasks but lacks innovation (eg Burns and Stalker 1961, Bennis and Slater 1964, Mintzberg 1979, Scott 1992, Daft 1998).

- The market form (Arrow, 1962; Arrow and Hurwicz, 1977; Stiglitz, 1994) co-ordinates buyers and sellers through the price mechanism, raising prices to stimulate supply and suppress demand for a product, bringing about equilibrium and efficiency through an 'optimising' process. Knowledge has particular qualities, leading markets to fail (or achieve 'second best' (Miller, 1992)) rather than optimise. Adler discusses explicit rather than tacit knowledge, arguing that the lower cost of transferring codified knowledge over and above tacit knowledge gives explicit knowledge a continued role in economic growth. Explicit knowledge may be regarded as a 'public good' where supply is not diminished by demand or consumption – like radio transmission, it can be enjoyed by one consumer or a hundred, with no impact on the availability of the signal. The 'free rider' effect is an implication, where one person pays and a hundred benefit.
- Community, based on relationships, depends on trust, which includes predictability and consistency as well as 'confidence in another's goodwill' (Ring and Van de Ven, 1992).

10.2.2 Organisational Form and Type of Knowledge

Lam (2000) analyses the firm's knowledge along two dimensions: epistemological (tacit-explicit) and ontological (individual-collective). They give rise to four types of organisational knowledge, described as embrained, embodied, encoded and embedded (Collins, 1993; adapted by Blackler, 1995).

Figure 32. Types of Organisational Knowledge (Source: Lam, 2000)

		Ontological dimension	
		individual	collective
Epistemological dimension	explicit	Embrained knowledge	Encoded knowledge
	tacit	Embodied knowledge	Embedded knowledge

Individual knowledge can be used with autonomy and is specialised and transferable. Collective knowledge exists 'between rather than within' individuals, describing the rules, procedures, policies that contribute to the 'memory' or 'collective mind' of the organisation (Walsh and Ungson, 1991). Embrained (individual-explicit) is formal and abstract and depends upon the individual's conceptual and cognitive faculties. It is highly respected in Western culture. Embodied knowledge (individual-tacit) is practitioner-based, relying on bodily experience, or 'doing'. It is context-specific as it comes into being through application. Encoded knowledge (collective-explicit) is 'information', codified through signs and symbols, and inevitably simplified because it cannot incorporate tacit skills. Embedded knowledge (tacit-collective) is rooted in communities of practice (Brown and Duguid, 1991) and is socially constructed and interactive in nature.

Four contrasting models of organisational learning are derived from dimensions of knowledge type and organisational form. A spectrum of high-low knowledge and work standardisation is configured against individual-organisation agents of autonomy and control to produce: professional bureaucracy, machine

bureaucracy, operating adhocracy and J-form organisation.

Figure 33. Type of Organisational Form (Source: Lam, 2000)

		Knowledge agent (autonomy and control)	
		individual	organization
Standardization of knowledge and work	high	Professional bureaucracy	Machine bureaucracy
	low	Operating adhocracy	J-form organization

Explicit knowledge is readily standardised and aggregated and lends itself to the regulation and co-ordination of a bureaucracy. Tacit knowledge bases require informal co-ordination mechanisms, due to its dispersed and subjective nature, that may be available in decentralised organisational structures. Organisations may depend upon key individuals, granting them autonomy, or may depend upon collective knowledge of members.

Lam uses Mintzberg's (1979) typology of organisational forms together with that of Aoki (1988) and Nonaka and Takeuchi (1995) on the Japanese model. She associates each form with a dominant knowledge type: professional bureaucracy/embrained knowledge; machine bureaucracy/encoded knowledge; operating adhocracy/embodied knowledge; J-form organisational/embedded knowledge.

- Professional bureaucracy and embrained knowledge: highly trained individual experts are co-ordinated by standardisation of knowledge and skills through formal education and training. External education institutions and professional bodies play a regulatory role. The knowledge structure is "individualistic, functionally segmented and hierarchical". 'Experts' are inhibited from sharing knowledge with 'non-experts' and tacit knowledge plays a limited role.
- Machine bureaucracy and encoded knowledge: Specialisation, standardisation and control are used to achieve efficiency and stability in an organisation. Knowledge agents are managers who communicate rules and procedures up and down the hierarchy of the organisation, with the effect of centralising management information which becomes knowledge itself. The knowledge structure is collective, functionally segmented and hierarchical.
- Operating adhocracy and embodied knowledge: it is an organic form with little standardisation, relying on individual experts operating in market-based project teams, e.g. management consultancies. The knowledge structure is individualistic but collaborative. Individual experts are the knowledge agents and there is an 'inter-dependent professionalism' at work. Market outcomes are measures of performance, so that clients judge expertise, not professional bodies (Starbuck, 1992). 'Porous boundaries' make knowledge intensive firms vulnerable to loss of individuals and expertise. 'The operating adhocracy is the most innovative and yet it is the least stable form of organisation' (p497).
- J-form organisation and embedded knowledge: 'J' stands for Japanese. Organic, non-hierarchical teams operate in parallel to a formal hierarchical managerial structure, and are glued together by a strong corporate culture or shared values, which constitutes the knowledge base of the organisation. The

key knowledge agent is the semi-autonomous project team, drawing members across the organisation from different functions. It has a stable social structure and shared knowledge base, resulting in a level of conformity that may make it difficult to innovate radically (Levinthal and March, 1993: 108; Dodgson, 1993: 383).

10.2.3 Joint Ventures and Alliances

Inkpen (2000) discusses growing interest in formation of strategic alliances, where relationships are based on partnership rather than ownership. He focuses on the organisational learning dimension as an explanatory factor, where alliances enable firms to learn from their partners, and specifically on management and transfer of alliance knowledge – called alliance knowledge acquisition – by partner firms. Formation of a Joint Venture (JV), or strategic alliance, signals that some knowledge value is available from one partner to another. The JV provides access, but knowledge acquisition requires more effort. The level of effort, Inkpen proposes, will increase with the perceived value of the knowledge. The partners engage in a cost-benefit analysis of power *versus* co-operation and their payoff.

10.2.4 Networks, Co-Ordination and Collaboration

Support for networks comes from Dyer *et al* (2000) who use Toyota to show how network-level knowledge-sharing processes create advantages. By creating a strong network identity, with tough eligibility criteria for admission, Toyota has been able to: (1) motivate members to participate and openly share valuable knowledge (while preventing undesirable spillovers to competitors); (2) prevent free riders, and (3) reduce the costs associated with finding and accessing different types of valuable knowledge. Dyer *et al* suggest that “if the network can create a strong identity and coordinating rules, then it will be superior to a firm as an organizational form at creating and recombining knowledge due to the diversity of knowledge that resides within a network” (p345).

Young *et al* (2001) describe the network/institutional perspective as recognition that organisations are embedded in multiple networks that can stimulate adoption of innovation: “being embedded in a network of social relations can bring one news of innovations, support for adoption, helpful hints regarding implementation, and social support encouraging change” (Scott, 1990, p184; quoted in Young *et al*, 2001, p939).

Willem *et al* (2006) conducted a study of international multi-national corporations where knowledge tended to get locked in within certain units. They formulate a typology of co-ordinating mechanisms:

- Formal systems – formal with programmed task
- Lateral co-ordination – formal but less programmed
- Information networking – not programmed and not formal
- Shared values – programmed tasks and behaviour but not formally established

The study found that informal networking was not seen to be helpful in co-ordinating knowledge sharing between units within an organisation. Instead, formal co-ordination was preferred, especially when they clarify and support relationships between units.

Hardy *et al* (2003) describe two dimensions of collaboration, i.e. embeddedness and involvement, to enquire about three possible effects of collaboration: strategic, knowledge creation and political. They find trade-offs. For example,

there is a tension between knowledge creation and strategic (or competitive) advantage. Being highly involved leads to strategic effects but being highly embedded at the same time leads to knowledge creation effects. The leakiness of being embedded dissolves strategic advantage because word spreads quickly and members of the network are forced to share.

Verona *et al* (2006) look at how network structures support innovation, using a framework of virtual knowledge brokers (VKB), knowledge brokers (KB) and virtual customer environments (VCE). They suggest that the internet is creating a new organisational form.

Table 11. A Comparison between Mechanisms for Supporting a Firm's Innovation Process (Source: Veron *et al*, 2006)

	VKB	KB	VCE
Type of contact	Mediated	Mediated	Direct
Source of knowledge	Industrial and inter-industrial	Inter-industrial	Industrial
Type of outcome	Knowledge for innovation	Product design	Knowledge for innovation
Role in the process	Invention and innovation	Invention	Invention and innovation
Type of orientation	Network orientation	Client orientation	Firm orientation
Type of interaction	Continuous	Spot	Continuous
Core competence in the brokering cycle	Network access	Absorption and integration	Absorption and implementation
Main limit	Knowledge implementation	Network access	Network access

10.2.5 Management Consultancies & KIFs

A body of literature has emerged that focuses on consultancy companies, also called knowledge intensive firms (KIFs) or professional services firms (PSFs), e.g. Werr & Stjernberg, 2003; Lowendahl *et al*, 2001; Robertson *et al*, 2003; Hansen *et al*, 2001; Empson, 2001; Alvesson, 2001; Haas *et al*, 2005). They are mainly considered in the context of knowledge sharing, e.g. relational versus technical mechanisms of exchange, barriers to transfer through knowledge hoarding, and types of knowledge

Robertson and Swan (2003) draw on Alvesson's (2001) link between personal identity and consultancy work. They highlight the importance of culture to show how 'knowledge workers' conform and co-operate within their company environment by balancing their autonomy and expertise with a sense of being part of an elite. Ambiguity allowed individuals to be both 'expert' and 'consultant'. "Thus, the culture that embraced ambiguity (a consensus that there would be no consensus) engendered a form of normative control whereby consultants operated freely and at the same time willingly participated in the regulation of their own autonomy" (p831).

Papers are quite specific in their references to named companies. Werr and Stjernberg (2003) distinguish between standardized and creative services. "Within the management consulting industry, 'big five' consulting companies such as Cap Gemini Ernst & Young and Accenture are often described as offering more standardized services, whereas the traditional strategy consulting companies such as McKinsey, BCG and Bain offer a less standardized and more creative kind of service" (p903).

Lowendahl *et al* (2001) present a framework for analysing value creation and knowledge development for PSFs. It integrates the relationship between

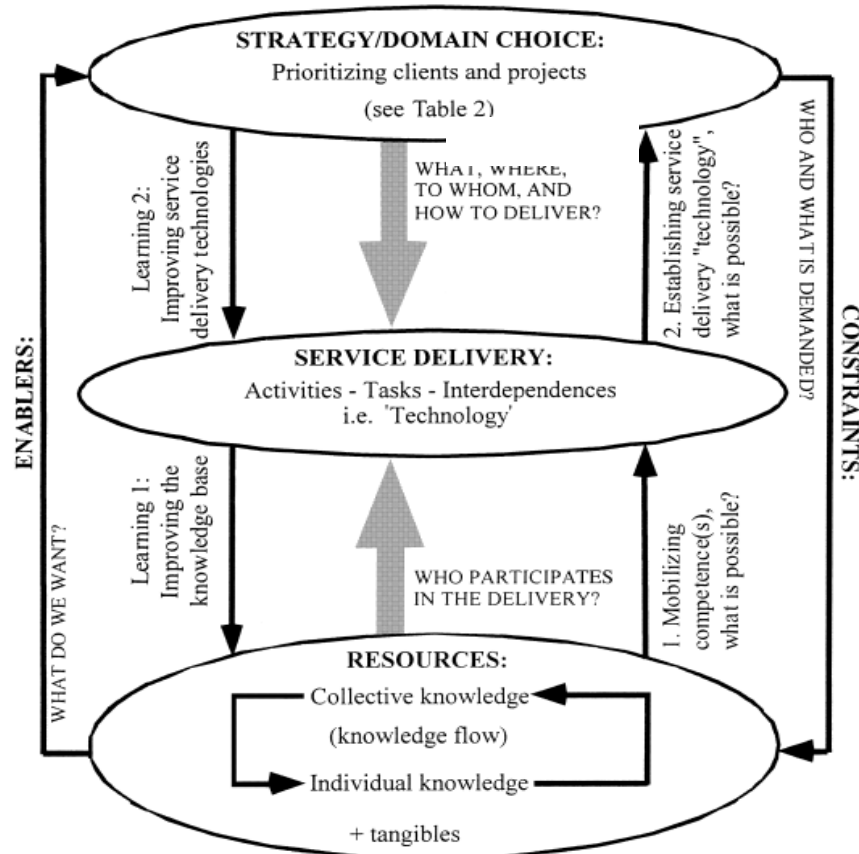
strategy/ domain choice and knowledge base. The domain choice sits on a spectrum of low to high customisation, where mediation and negotiation is bespoke and audits are highly-standardised processes. The knowledge base is also described as a spectrum from codified knowledge to shared culture (see below). The bridge between domain choice and knowledge base is explained as a value creation process (VCP) with two inter-related dimensions: direct value creation for the clients and indirect value creation by enhancing the PSF's knowledge base.

Table 12. Knowledge of different types and different levels (Lowendahl *et al*, 2001, p918)

	<i>Individual knowledge</i>	<i>Collective knowledge</i>
Fact-based knowledge, 'know-what'	Facts, expertise.	'Codified knowledge' (Hansen <i>et al</i> , 1999), databases, information about who knows what.
Experience-based knowledge, 'know-how'	'Grey hair' (Maister, 1993); 'personalized knowledge' (Hansen <i>et al</i> , 1999), skills.	Norms, routines, best practices, shared 'ways of doing things', 'organizational skills' (Nelson & Winter, 1982).
Dispositional knowledge, identity	Aptitudes, talents, intelligence, etc.	Shared culture, mechanisms of socialization, unique language or code, corporate identity.

Source. Builds on and extends Kogut and Zander (1992: 388) and Lowendahl (1992: 527)

Figure 34. Model of Value Creation and Knowledge Development for PSFs (Source: Lowendahl *et al*, 2001)



10.2.6 Public Sector Organisations

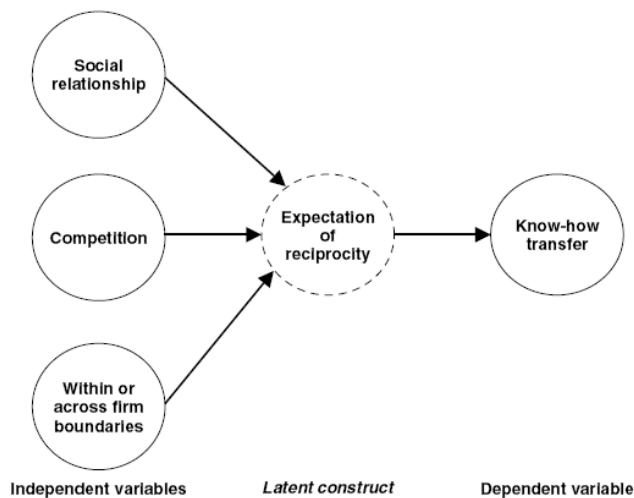
The public sector is different, according to Van Beveren (2003), who considered KM within an Australian health care organisation. Through a series of workshops, he identified barriers to knowledge sharing that are inherent in the organisational structure of health care. For example, the organisation has a hierarchical structure with many levels of management, where information flows mainly upwards. Managers are reluctant to send information downwards because they do not think it will affect employee performance. The professional structure inhibits knowledge sharing. In terms of relationships, it was commented that very few social functions are supported by the organisation, except for fund-raising, and that senior management rarely attend events with employees.

10.3 Boundary Factors

10.3.1 Competitiveness, Social Relationship, Reciprocity

Kachra and White (2008) found that stronger social relationships, lower levels of competition and the absence of firm boundaries contributed to a higher level of know-how-transfer in their study of 79 biotechnology R&D scientists. 'Know-how' or 'expertise' refers to tacit, non-proprietary technological knowledge (e.g. Dyer and Hatch, 2004). Their findings support a general theory of reciprocity in which social, competitive and reciprocal relationships add up to a decision whether or not to transfer know-how, schematized in the figure below.

Figure 35. Modelling Know-How Transfer (Source: Kachra and White, 2008)



10.3.2 Trust

"... I used to be very transparent about everything I know. I learned now that information must take the official channel-flow for people to learn about it. This is because I lost my confidence in people around me when I knew they tend to misuse the information before it reaches the intended parties." (Al-Alawi *et al*, 2007, p 34)

Trust and Organisational Form

Adler (2001) describes trust in terms of four dimensions (sources, mechanisms, objects and bases) and their components:

Table 13. Dimensions and Components of Trust (Source: Adler, 2001)

DIMENSIONS	COMPONENTS
sources	<ul style="list-style-type: none"> • familiarity through repeated interaction • calculation based on interests • norms that create predictability and trustworthiness
mechanisms	<ul style="list-style-type: none"> • direct interpersonal contact • reputation • institutional context
objects	<ul style="list-style-type: none"> • individuals • systems • collectivities
bases	<ul style="list-style-type: none"> • consistency, contractual trust • competence • benevolence, loyalty, concern, goodwill, fiduciary trust • honesty, integrity • openness

Adler proposes that there is a trend towards trust in the knowledge-intensive economy with regard to employment and intra/inter-firm relations. At the level of interdivisional and interfirm relations, strategic alliances and other forms of networking are proliferating in response to growing knowledge-intensity (Nelson 1988, Powell 1990, Liebeskind *et al* 1996), which Adler interprets as a trend towards high-trust forms. He describes the 'dark side' of trust within teams as complacency, elitism, familiarity and poor innovation (Kim, 1997). Trust-based firms risk being cast into traditional clans and closed communities. Adler suggests that 'reflective trust' is a model for the future. It is a sceptical form of trust, where integrity and competence is ranked more highly than loyalty. He concludes that trust will flourish if it is: (a) balanced by hierarchical rules to ensure stability and equity, (b) balanced by market competition to ensure flexibility and opportunity, (c) modern and reflective rather than traditionalistic and blind.

Trustworthiness, Risk and Transfer of Tacit and Explicit Knowledge

Becerra *et al* (2008) set their empirical enquiry on the theoretical foundations of knowledge exchange in alliances (Inkpen and Dinur, 1998; Simonin, 2004) as well as research on trust (Mayer *et al*, 1995; Rousseau *et al*, 1998). Since partners in learning alliances are potentially vulnerable, "the perceptions of trustworthiness of the other side become essential for the partners to be willing to take risks" (p692).

They found that tacit and explicit knowledge are different in their relationship to trustworthiness and risk. In an alliance of partner firms, transfer of explicit knowledge is associated with willingness to take risk. It has little to do with whether the partners think the alliance is likely to be successful. Tacit knowledge, on the other hand, will only be transferred if the partner perceives the recipient as trustworthy. It is also linked to whether the partners think the alliance will be successful.

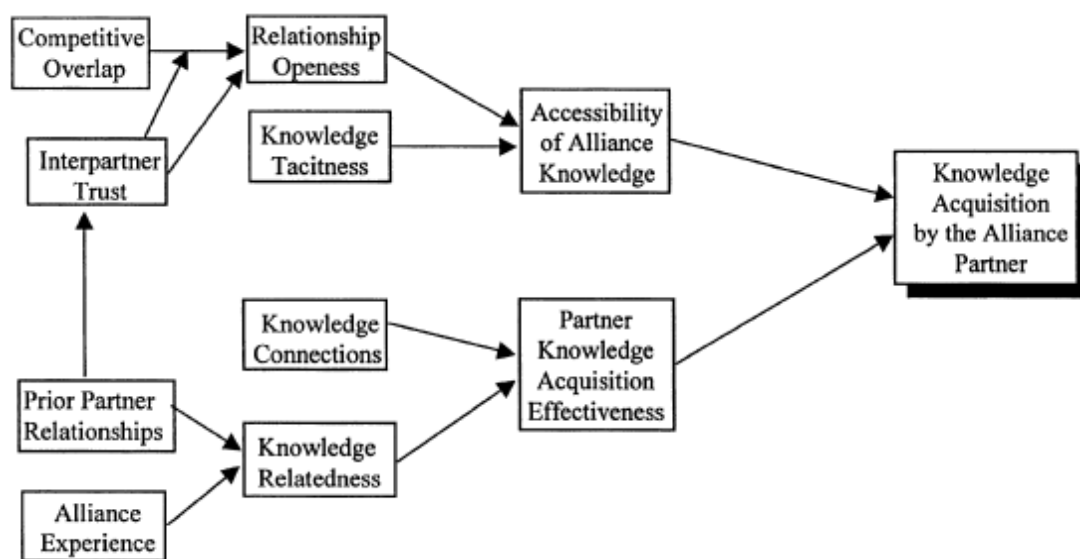
In contrast to some empirical research (Dhanaraj *et al*, 2004), Becerra *et al* found

that transfer of tacit knowledge is more closely associated with alliance performance than explicit knowledge transfers. This is consistent with RBV and the importance of tacit knowledge for competitive advantage. Explicit knowledge, associated with risk-taking, seemed to be more carefully guarded by managers.

Trust and Knowledge Acquisition

In the context of strategic alliances and joint ventures (JV), knowledge acquisition (modelled below) is determined by partner openness on the one hand, and complexity of alliance knowledge on the other (Inkpen, 2000, p1026). Openness in information sharing will be determined by trust. Knowledge acquisition will be more likely if the partners have a history of collaboration, stimulating trust and reducing barriers. Alliance involvement is described as 'a broadening experience that adds to the firm's capacity to assimilate new experiences'.

Figure 36. Model of Knowledge Acquisition (Source: Inkpen, 2000)



10.4 Exemplar Papers

10.4.1 Most Cited – Joint Venture as Organisational Form

Box 22. Abstract from Inkpen (2000)

Joint ventures (JVs) are becoming an increasingly important organizational form in international business. When JVs are formed, valuable learning opportunities may be created for the venture partners. The primary objective in this paper is to explore the conditions under which firms exploit JV learning opportunities through the acquisition of knowledge. A framework of knowledge acquisition by JV partner firms is proposed. Using JV partner organizations as the primary level of analysis, the paper identifies various factors that influence the acquisition of learning, its value to the learning organization, and the migration of knowledge from the JV to the parent. Two firm specific learning-based concepts are developed: alliance knowledge accessibility and knowledge acquisition effectiveness.

Inkpen alludes to different units of analysis that may be considered in any future empirical work. Within the firm there are a range of organisational levels and actors. The firm itself is one of several partners who engage in a strategic alliance. Beyond them there may be a parent firm which manages the process.

For example, General Motors was parent to two Japanese assembly JVs (NUMMI and CAMI, a General Motors-Suzuki venture) which informed a new operation in Argentina, based on visits by 60 Argentine staff to NUMMI. These parent alliances create an equity JV of partner firms. The parent and (offspring) partner JVs are separate organisational forms. The purpose of the paper is to use alliances as a specific learning context and test-bed for further exploration of knowledge access and acquisition.

10.4.2 Interest – Trends of Thought

Box 23. Abstract from Nonaka (2006)

Organizational knowledge creation is the process of making available and amplifying knowledge created by individuals as well as crystallizing and connecting it to an organization's knowledge system. In other words, what individuals come to know in their (work-) life benefits their colleagues and, eventually, the larger organization. The theory explaining this process — the organizational knowledge creation theory — has developed rapidly in academia and been broadly diffused in management practice over the last 15 years. This article reviews the theory's central elements and identifies the evolving paths taken by academic work that uses the theory as a point of departure. The article furthermore proposes areas in which future research can advance the theory of organizational knowledge creation.

Nonaka is a significant author in the field, drawing western attention to Japanese organisational knowledge, and his 2006 article is a relatively recent exposition of trends. The authors go further in the fusion between east and west, referring to the concept of *ba* or 'space', as a condition for knowledge generation. Areas of future research are proposed:

- Origins of knowledge: Empirical exploration of *ba*
- Origins of organisation: Contribution of leadership and entrepreneurship *versus* prior knowledge in building organisations
- Dynamics in organisational adaptation: Why organisations fail

11. Resource Based View of the Firm

(Phase 1 Management Literature)

The Resource Based View (RBV) of the firm is an economic perspective where the firm, or organisation, is defined as the sum of the resources at its disposal. It gains competitive advantage by protecting and mobilising these resources (Wernerfelt, 1984, Barney 1991). Knowledge fits within RBV as one of the firm's major resources. "Knowledge is viewed as an asset and the role of knowledge is to progress individuals, organizations and society to the ideal state of enlightenment (or competitive advantage)" (Schulze and Stabell, 2004, p557).

Edith Penrose's (1959, 1995) theory of the growth of the firm is credited with providing the foundation of RBV. Penrose draws attention to the importance of socialisation and network relationships in technological innovation. Dynamism in small firms, she suggests, can be located in the 'interstices' at the boundaries of large firms. Spender (2008) draws a contrast between her position, where managers create knowledge, and the current idea cemented by Barney *et al* (2001) that managers use "already-possessed knowledge" (p169).

RBV takes a positivist approach, treating knowledge as an asset that can be transferred. In fact, the management literature generally is underpinned by the implicit or explicit assumption that organisations are firms which seek competitive advantage. In the context of organisational learning, for example, Lam (2000) notes that knowledge is increasingly regarded as the critical resource of firms and economies and that tacit knowledge has come to be regarded as important for securing competitiveness, technological innovation and learning (Grant, 1996; Hall, 1993; Winter, 1987; Teece and Pisano, 1994; Howells, 1996; Nonaka and Takeuchi, 1995; Spender, 1996b).

Easterby-Smith and Prieto (2006) summarise RBV: "each organization possesses a different profile of tangible and intangible resources and capabilities, and these differences account for variations in organizations' competitive positions and their performance (Amit and Schoemaker, 1993; Barney, 1991; Penrose, 1959; Peteraf, 1993; Reed and DeFillippi, 1990; Rumelt, 1984; Wernerfelt, 1984). The core principles of the resource-based view are that resources and capabilities which are simultaneously valuable, rare, imperfectly imitable and non-substitutable – the VRIN conditions – are the main source of above-normal rents and competitive advantage (Barney, 1991; Wernerfelt, 1984)" (p236).

11.1 Themes Covered in the Literature

Cross-cutting themes are considered here in relation to *value* and to competing theories.

11.1.1 IS/IT

Two perspectives on IS/IT exist. On the one hand it adds value to the firm by enhancing enhance dynamic capabilities (Sher *et al*, 2004). On the other hand, the commodified view of knowledge is found to be misplaced and IS/IT can close down boundaries rather than open them up. These opposed findings highlight the tension between positivist and relational views of knowledge. Donaldson (2001) cautions over-enthusiasm in rejecting positivist notions of knowledge in a rush to embrace tacit knowledge. To do so "might lead us to overlook the extent to which knowledge management is leading to increasing rationalization and

bureaucratisation of knowledge in knowledge-intensive firms and other organizations” (p961).

11.1.2 Relational and Positivist

Recent debates in RBV concern relational versus resource-based views, and try to integrate them. Connell and Voola (2007) explore ‘relationship market orientation’ and the link between trust and performance in strategic alliances. A questionnaire survey was used to investigate knowledge sharing among alliance partners. The researchers concluded that Alliance partners should accord the same care to intangible assets, including relationships and knowledge, that they would give to tangible assets.

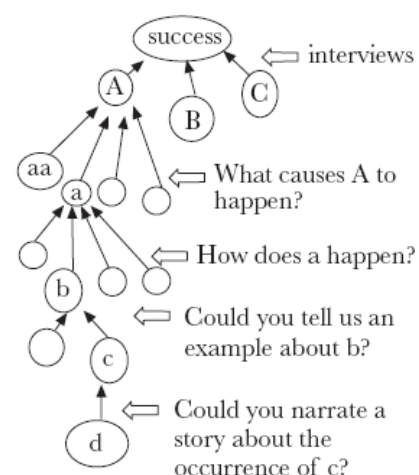
Mesquita *et al* (2008) compare resource-based and relational perspectives, within the context of vertical learning alliances, to examine competitive advantages. They found empirically that RBV helped to explain average performance, but that the relational factors revealed an exclusive performance edge. Their conclusion was that ‘relational performance’ was “the true source of learning dyads’ competitive advantage” (p913). Relational views look to *interfirm* rather than *firm* sources of advantage. The concept draws on the work of Dyer who has worked extensively on relation-specific capabilities and barriers to knowledge transfer (e.g. Dyer and Singh, 1998, 1999). There is a distinction and a tension between knowledge transfer, knowledge appropriation, redeployable performance (based on resources) and relational performance (based on trust and other relational factors). The authors attempt to integrate these perspectives.

11.1.3 Empirical Operationalisation of Tacit Skills

Ambrosini and Bowman (2001) pick up the lack of empirical support available to test the proposition that tacit knowledge is difficult to imitate, to substitute, to transfer, is rare, and that it confers competitive value. They redefine tacit knowledge as tacit skills, within the context of RBV, and develop a qualitative methodology to operationalise it, using causal mapping, self-Q and storytelling.

Figure 37. Summary of proposed method to research tacit skills (Ambrosini and Bowman, 2001, p823)

1. Preliminary interviews about what causes success in the organization to elicit constructs to start the map (A, B and C)
2. Set up the map with the preliminary constructs as starting points
3. Begin the mapping process with questions such as:
What causes that?
How does it happen?
4. If the flow of constructs stops, ask questions such as:
Could you give us an example of how that happened?
Could you tell us a story?

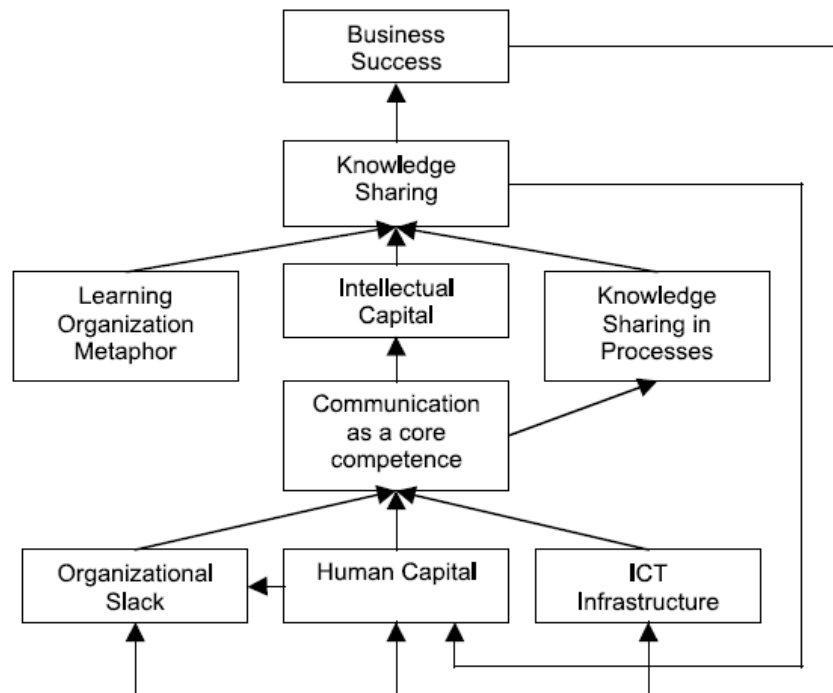


11.1.4 Social Capital

The theme of social capital is linked to knowledge management and knowledge sharing by Widen-Wulff and Ginman (2004). They put forward a theoretical framework that links social factors on information behaviour and knowledge

construction, e.g. relationships, social identity, organisational culture and community networks. Social capital measures include trust, values, membership and participation. The conceptual framework is shown below.

Figure 38. Knowledge Sharing Model (Widen-Wulff and Ginman, 2004, p451)



11.2 Exemplar Papers

11.2.1 Most Cited – Study of Competitive Advantage

Box 24. Abstract from McEvily and Chakravarthy (2002)

Resource-based theory maintains that intrinsic characteristics of resources and capabilities, such as their tacitness, complexity, and specificity, prevent imitation and thereby prolong exceptional performance. There is little direct evidence to verify these claims, yet a substantial literature encourages firms to formulate competitive strategies around resources with these attributes. Further, work outside the resource based tradition suggests that these attributes can slow innovation, and it is not clear when this effect outweighs the benefits of inimitability. This paper seeks to clarify whether and how the complexity, tacitness, and specificity of a firm's knowledge affect the persistence of its performance advantages. We find that the complexity and tacitness of technological knowledge are useful for defending a firm's major product improvements from imitation, but not for protecting its minor improvements. The design specificity of technological knowledge delayed imitation of minor improvements in this study

McEvily and Chakravarthy test the theory of competitive advantage at the heart of RBV. In the literature, knowledge is emphasised as a source of superior performance (Drucker, 1995; Spender and Grant, 1996) in which "complex, specialized, tacit knowledge generates more durable advantages because it is difficult to imitate" (p285) (Winter, 1987; Reed and DeFilippi, 1990). The longer a firm can protect its unique resource, because rivals cannot copy it, the more persistent will be its advantage. At the same time, there is little empirical work

to support the link between knowledge and performance (Teece, 1998). The authors look at complexity, tacitness and specificity (CTS) of technological knowledge and its link with performance and diffusion.

CTS increases stickiness and make it more costly to transfer knowledge across organisational boundaries (Williamson, 1985; Zander and Kogut, 1995; Szulanski, 1996; Galunic and Rodan, 1998; von Hippel, 1998). Barriers to imitation will protect a firm's performance advantage as long as there are no other better ways to close the gap. The authors hypothesise that RBV predictions of CTS barriers and performance advantage will hold for major rather than minor performance advantages, since major advantage is more costly to imitate. They go on to hypothesise that each of the elements of CTS will be positively related to the persistence of a firm's major performance advantages and that CTS as a bundle will not be significantly related to persistence of minor advantages.

Adhesives, used in end-products from airplanes to nappies (diapers), provided the test-bed for McEvily and Chakravarthy's hypotheses. The results broadly support RBV theory that imitation barriers, located in knowledge, protect inter-firm performance advantage, and are consistent with Zander and Kogut's (1995) work on manufacturing capabilities. CTS as a barrier between organisations can also, however, be a barrier to transfer and transformation within an organisation, so the authors do not advocate pursuing CTS as a goal in itself. The detailed empirical work revealed the challenges involved in measuring knowledge and barriers to imitation.

11.2.2 Interest - Industry Type Including Health Care

Wilcox King and Zeithaml's (2003) paper addresses the problem of identifying and measuring knowledge resources.

Box 25. Abstract from Wilcox King and Zeithaml (2003)

Knowledge is fundamental to strategic success. Limited progress has been made, however, in measuring organizational knowledge. We employ research on resource-based theory and organizational epistemology to suggest a perceptual approach to measuring knowledge. We present a research protocol to identify a domain of organizational knowledge resources within industries. Using a sample of organizations from the hospital and textile industries, we interviewed CEOs to identify the feasible set of knowledge resources. We presented this set to managers at those organizations to measure their perceptions of the value-added of each knowledge resource for their organizations. The results demonstrate that the importance of knowledge resources varies by industry and organization, and calls to question efforts to generate an inventory of generic knowledge resources that is applicable across industries.

Organisational knowledge is defined as "a firm's capacity to act that can differentiate it from competitors and provide competitive advantage (Leonard-Barton, 1992)" (p764), and RBV theorists impute competitive advantage from knowledge (Barney, 1991). Knowledge is conceptualised as having three properties: first, enactment through multiple 'knowers' (e.g. Tsoukas, 1996; Orlikowski, 2002; von Hippel, 1994); second, scope and context, e.g. health care; thirdly, language (von Krogh *et al*, 1994).

The authors present a four-step methodology and test it with practising managers in 17 firms within the textile and health industry. The researchers found that only one comparable knowledge resource emerged across the board: "cost containment for hospitals and managing costs for textiles" (p769).

12. Communities of Practice

(Phase 1 Management Literature)

Communities of Practice (CoP) are groups of people who, through working together, have developed into a cohesive community with mutual understandings. CoP is now a well-established theoretical device, and a highly influential way of conceptualising how decentralised sub-units or groups within firms or organisations operate (Lindkvist, 2005, p1189). In terms of knowledge mobilisation, they mark a shift of interest away from technical solutions towards human factors, with an emphasis upon tacit knowledge shared through situated learning. They are defined as:

“an activity system about which participants, share understanding concerning what they are doing and what that means for their lives and for their community. Thus, they are united in both action and in the meaning that that action has, both for themselves, and for the larger collective.” (Lave and Wenger, 1991, p98; cited in Swan *et al*, 2002. p478).

The term CoP interfaces Organisational Learning, as it describes the process of shared learning and practice, or situated learning, that occurs when groups of people with common objectives interact and work together. It brings in the discipline of psychology (e.g. Jerome Bruner, 1986) and questions of identity and cognition, within the framework of economics where the firm is the organisation, and anthropology which deploys ethnographic methods to observe situated learning (Lave and Wenger, 1991; Wenger, 1998). Lave and Wenger's (1991) study, referring to the social worlds of midwives, tailors, alcoholics anonymous, highlights the phenomenon that knowledge resides in social relations, and knowing is part of becoming an insider in a community of practice (Gherardi, 2001).

Brown and Duguid (2001) reflect on the enthusiasm that has greeted the idea of CoP, speculating that 'community' sounds appealing and warm, whereas 'cadre' or 'commune' might have prompted a lower uptake. 'Practice' on the other hand, meaning "undertaking or engaging fully in a task, job, or profession" (p203), draws attention to division, since it is the means of distinguishing differences between participants. The concept is readily adapted to the health sector, since occupational groups such as nurses and doctors form natural epistemic communities. It crossed over to health early in our review period (Bate and Robert, 2002).

12.1 The Theory

Communities of Practice (CoP) are internal units of the firm where knowledge sticks. Idiosyncratic individual knowledge is much less important than the communal and coherent body of knowledge that builds up over time, where "vital knowledge is decentred, residing in the activities, the narratives, or the culture of the community" (Lindkvist, 2005, p1207). Brown and Duguid (2001) suggest that too much attention is focused on the idea of community and too little on practice. This section focuses on the practice element.

12.1.1 Situated Learning

The main characteristic of 'situated learning theory' (SLT), according to Gherardi

(2001), has been its discussion (Lave, 1988; Brown *et al*, 1989) of the concept of 'context'. This is in polemic with traditional cognitive theory (TCT) which regards context as the container of "decontextualized knowledge (impersonal, detached, asocial, apolitical, ahistorical, immaterial)" (p134). Fox (1997) compared TCL and SLT, drawing a parallel between modernism and postmodernism. The modernist project sees context as pre-given; the postmodernist project sees context as 'emergent': 'In the postmodern view, "context" is no longer "out there" in the messy, complex surface of an objective world; rather, that very surface complexity and confusion are a projection of language itself, the inconsistencies of its classifications, taxonomies, dichotomies, and more' (Fox, 1997: 741).

12.1.2 Knowing in Practice

Orlikowski (2002) describes the practice element of CoP by shifting the focus from *knowledge* to *knowing*: "organizational knowing as emerging from the ongoing and situated actions of organizational members as they engage the world," informed by work of the sociologist Giddens (1984) and anthropologists Lave (1998), Hutchins (1991) and Suchman (1987).

In an empirical study of "a highly successful organization" she identified seven boundaries: temporal, geographic, social, cultural, historical and technical and political, informed by the multinational and distributed nature of operations. The boundaries were mapped to a repertoire of practices in which this success was grounded: sharing identity, interacting face to face, aligning effort, learning by doing and supporting participation. The practices "generate and sustain a collective competence in distributed organizing" (p257). The negative consequences are also identified: "sharing identity becomes organizational groupthink, interacting face to face leads to burnout, aligning effort discourages improvisation, learning by doing is lost through turnover, and supporting participation is immobilizing because of conflicts and time delays" (p257).

Orlikowski concludes that while leadership, infrastructure and corporate mission are essential (p269), success and innovation is dependent upon collective and distributed competence framed as 'know how to do'. The view of organisational knowing as "a socially constituted competence, and this collective, distributed, and emergent" (p270) builds on Tsoukas' human-action model of a firm as distributed knowledge system (1996).

Shared knowing has implications for shared identity, where an organisation is what an organisation does, and identity is something that is continually "enacted and reinforced through situated practices" (p270). "Best practice" is jettisoned as a concept in favour of "useful practices", and knowledge transfer is regarded as less useful than sharing "knowing how" by developing people's capacity for action in a variety of settings.

12.1.3 Stickiness, Leakiness and Practice

Brown and Duguid (2001) build on their body of work (1991, 2000) which set CoPs within an organisational context. They introduce a taxonomy of three types of knowledge, conceptualised as: "sticky" (von Hippel 1994, 1999; Szulanski 1996) and how to enable transfer; "leaky" (Liebeskind *et al*, 1996; Wernerfelt, 1984) and how to protect innovation from transfer across porous boundaries; and "mobile" (Hoopes and Postrel 1999).

Local CoPs may be distributed across the world, forming loose epistemic groups or "networks of practice." Knowledge can flow horizontally along these networks

beyond vertical organisational boundaries through media such as the internet. Organisations are conceptualised as collections of CoP whose members stand at the intersection of the organisation and the network (p206), allowing passage of leaky knowledge. Members' loyalty may be divided between the two. The firm may exist in the worst of all worlds, coping simultaneously with internal stickiness (through internal divisions of labour) and external leaks (through external connections with 'epistemic communities'). If the organisation attempts to exert hierarchical control to limit autonomy of CoP, it will inhibit innovation. Organisations need to negotiate with CoP rather than trying to co-ordinate hierarchical flow of knowledge.

12.2 Communities in Context

12.2.1 A Reaction to IS/IT Technical Solutions

Information technology was the major driving force in knowledge mobilisation in the 1990s, leading to highly sophisticated tools (groupware, discretionary databases, intranets, knowledge-management systems, workflow technology). Cabrera and Cabrera (2002) found that technical solutions were no longer a barrier to sharing knowledge across time and distance, but that social environments and relationships between co-workers prevented diffusion of knowledge. They offer a theoretical framework, borrowing the concept of 'social dilemma' from the social sciences as a variant on the classic 'public-good dilemma'. Three types of solution are proposed: increase the pay-off to knowledge sharers, making it worth their while either by reducing the cost or highlighting the benefit; increase people's perception of efficacy, by making them aware of the positive impact of exchanging insights; foster co-operation by increasing group identity and sense of personal responsibility. Creating knowledge-sharing communities of practice is identified as a way of achieving this.

12.2.2 Collectivities in Practice – Local and Beyond

Brown and Duguid (2002) argue that knowledge is local, shared among 'tightly knit' (Brown and Duguid, 1998) groups, since meaning varies across time and space. Regions such as Silicon Valley, with clusters of particular industries, are populated by networked communities or 'ecologies' (Tsoukas, 2002) that provide a stimulating and innovative environment. Swan *et al* (2002) show how managers build systems by 'constructing' CoPs among groups of professionals to exert influence that otherwise might have eluded them. In a study of professional service firms, Robertson *et al* (2003b) found that collective identity, based on elitism, helped to draw out creativity and expertise of individuals. Managers focused their effort on forging this collective identity.

The tightly-knit quality of CoPs does not fit short-life organisations or temporary project groups, according to Lindkvist (2005). He introduces the term "collectivities in practice" to draw a distinction between the knowledge community and the knowledge collectivity, which is distributed and networked, but does not share a communal practice or narrative.

Table 14. Comparison between the knowledge community and the knowledge collectivity: some important dimensions on which they differ (Lindkvist, 2005, p1205)

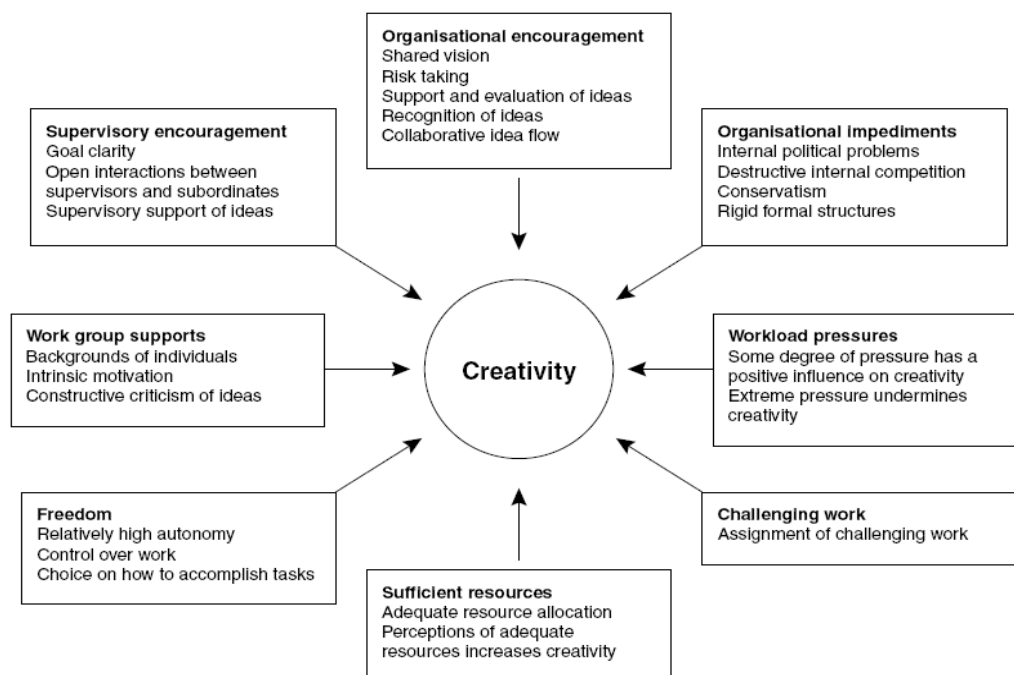
	<i>The knowledge community</i>	<i>The knowledge collectivity</i>
1. General type of knowledge base	Decentred knowledge	Distributed knowledge
Type of memory	Blackboard memory	Network memory
Main repository	Knowledge-as-practice Communal activity and narratives	Individual knowledge and competences
Integration principle	Knowledge base similarity	Well-connectedness of knowledge bases
2. The individual members		
Way of learning	Socialization	Problem solving
Operating basis	Dispositional knowledge	Articulate knowledge
Type of knowledge worker	Enculturated	Free agent (within limits set)
3. Type of knowledge development process	Paradigm-driven/normal-science process	Goal-directed trial-and-error/market-like process
4. Epistemological maxim	'We know more than we can tell'	'We tell more than we can know'

12.2.3 Creative Work Environment

Ensor *et al* (2001) interviewed senior managers from six London-based advertising agencies to develop a model of a work environment that stimulated creativity. It is based on project teams, often containing staff in their twenties.

Figure 39.

Fostering knowledge management through the creative work environment: a portable model from the advertising industry



12.3 *Knowledge Generated by Academics*

Mobilisation and utilisation of research knowledge generated by academics is a major strand of the brief of this scoping exercise, and is one of the prime motivators of the study.

Rynes, Bartunek and Daft (2001) dealt with the academics-to-academics nature of research papers. They discussed the disjoint in academic discourse between what is written (the end product) and the process of knowledge creation involving 'transformation from fuzziness to clarity'. The process of unearthing meaning and selecting and rejecting competing ideas is excised from the account. Academics are forced to fit square pegs into round holes by shoe-horning enquiries into theoretical frameworks, regardless of their fit.

They picked up Nonaka and Takeuchi's (1995) model of tacit and explicit knowledge, and Roger's (1995) model of knowledge transfer as a social process, to suggest that socialisation and interaction between researchers and practitioners is important to the process of learning. 'Knowledge generated by academics' becomes a misnomer in an interactive model, because of the double-loop process of feedback and response between the two communities.

Mohrman, Gibson *et al* (2001) developed a theoretical model for conducting research that is useful to practitioners, based on cognitive theory. They hypothesised that three factors – joint interpretive forums, perspective taking, and the impact of the research on organisational change – would determine practitioner perceptions of research usefulness. Empirical support was strongest for joint interpretive forums, emphasising the interactive nature of research dissemination where results are shared in a social setting.

12.4 *Exemplar Papers*

12.4 1. Most Cited – Knowledge and Knowing in Practice

Orlikowski (2002) conducts a qualitative empirical study within a theoretical framework that shifts emphasis away from *knowledge* and onto *knowing*. Her paper has had a high impact as 248 citations ranks second out of the all the management literature considered in our review. It has been used extensively in this scoping review to illuminate concepts of knowledge, since she provides a lucid account of knowing in practice that has underpinned much of the literature on situated learning that followed.

Box 26. Abstract from Orlikowski (2002)

In this paper, I outline a perspective on knowing in practice which highlights the essential role of human action in knowing how to get things done in complex organizational work. The perspective suggests that knowing is not a static embedded capability or stable disposition of actors, but rather an ongoing social accomplishment, constituted and reconstituted as actors engage the world in practice. In interpreting the findings of an empirical study conducted in a geographically dispersed high-tech organization, I suggest that the competence to do global product development is both collective and distributed, grounded in the everyday practices of organizational members. I conclude by discussing some of the research implications of a perspective on organizational knowing in practice.

12.4.2 Interest – Objects and Knowledge Boundaries

Box 27. Abstract from Swan *et al* (2007)

Understanding innovation in the biomedical field requires an appreciation of its highly interactive nature and of the many professional and organizational boundaries that create barriers to interaction and the sharing of knowledge. Yet, research to date has directed much less attention to understanding the intricacies of interactive biomedical innovation in practice, than it has to exploring the factors influencing innovation at an institutional level. Drawing upon empirical research and taking an approach informed by symbolic interactionism and a practice-based perspective on knowledge and learning, this article offers insights into the processes involved in supporting knowledge sharing by focusing on 'objects' and the varying roles they play (instrumental and symbolic) in enabling (or potentially disabling) interaction amongst groups and organizations involved in biomedical innovation projects.

The focus of this paper is innovation, but in the context of 'knowledge boundaries' set by specialised practice. Swan *et al* use the tenet that "knowledge (or what counts as knowledge) does not exist independently of social relations and social practices but is embedded in social interaction and situated practices" (p1811). Different actors engage with different kinds of knowledge (Carlile, 2002, 2004; Bechky, 2003; Wenger, 1998). Objects, e.g. a shared database, are established at boundary points to provide a common syntax. The paper demonstrates how the concept of situated learning, fundamental to communities of practice, has been integrated with theories of knowledge objects and their symbolic value.

13. Critical Theory (Phase 1 Management Literature)

Critical theorists are wary of knowledge management and analyse it as a tool of power. They adopt a philosophical and sociological perspective, focusing on 'management', and taking a critical view of its motivation. Modern critical theory can be traced to the works of Karl Marx (Alvesson & Willmott, 1996), developed by the Frankfurt School (including Horkheimer, Adorno, Marcuse, Fromm and Habermas, described in Lehr & Rice, 2002). Critical organizational theorists view the organization as a system of domination where those in power (owners, managers) exert control over those without power (employees, even customers) (Lehr and Rice, 2002). "Managers plan, organise, co-ordinate and control" whereas workers work. Management targets the minds or norms of workers, aiming to affect behaviour, ultimately to achieve normative control (Etzioni, 1961).

13.1 Critical Theory and Relationship with KM

13.1.1 Epistemological Context

Schulze and Stabell (2004) describe critical discourse as one of 'dissensus' which sees the world in terms of discord and asymmetry of power, adhering to evil-pure, guilty-innocent stratifications. A radical shift in power structures would be required to enact change: 'Consensus' is associated with a sociology of regulation, which assumes an underlying order and equilibrium, whereas 'dissensus' links to a sociology of radical change, in which the social order has an underlying instability through conflict and struggle. Researchers tend to fall into one or other camp, depending upon their world view. The table below summarises this dimension.

Table 15. Comparing Consensus & Dissensus (Source: Schulze & Stabell, 2004)

	<i>Consensus</i>	<i>Dissensus</i>
Assumptions about social relations	Trust Common interest	Suspicion Conflict of interest
Assumptions about social world	Hegemonic order as natural state	Conflict over order as natural state
Assumptions about the social role of knowledge	Science/knowledge is neutral; present order is naturalized	Science/knowledge is political; present order is historized and politicized

Schulze and Stabell build an epistemological framework by contrasting 'dualism', an *either/or* approach that is useful for classification, with 'duality' which implies *both/and*. One is taxonomic and the other is pragmatic. Dualism does not accommodate contradictions whereas duality positively embraces them by subjecting them to scrutiny. The authors construct a matrix that combines the duality-dualism and consensus-dissensus dimensions. They describe each field as a discourse rather than a paradigm, allowing for internal inconsistencies and weak demarcation. The four discourses are dialogic, critical, constructivist and neo-functionalist.

Figure 40. Putting Critical Discourse into and Epistemological Framework

	Duality	Dualism
Dissensus	Dialogic Discourse Metaphor of Knowledge: discipline Role of Knowledge in Organizations: deconstruction of totalizing knowledge claims, creation of multiple knowledges Theories: post-structuralist theories, feminist theories, postmodern theories	Critical Discourse Metaphor of Knowledge: power Role of Knowledge in Organizational Underclass: reformation of social order Theories: labour process
Consensus	Constructivist Discourse Metaphor of Knowledge: mind Role of Knowledge in Organizations: coordinating action, shared context, recovery of integrative values, generation of understanding Theories: structuration theories, theories of practice, sensemaking, actor network theory	Neo-Functionalist Discourse Metaphor of Knowledge: asset Role of Knowledge in Organizations: progressive enlightenment, prediction, reduction of uncertainty, optimal allocation of resources Theories: resource-based view of firm, transaction cost theory, information processing theory, contingency theories

Critical theory is polarised against the Resource Based View of the firm and information science disciplines which are consensual. In distinguishing between the 'people side' and the technology-focused approach to knowledge and its management (e.g. Alvesson and Kärreman, 2001), theorists warn us that KM is not value-free and that we need to be cautious about perverse or unintended consequences of actions.

The critical discourse is analytical, seeking to locate sources of power. Empirical case studies focus on use of IS/IT (e.g Currie and Kerrin, 2004; Doolin, 2004). Theoretical papers have formulated typologies, some of which are reprised here.

13.1.2 Contradictions: Knowledge and Management

Alvesson and Kärreman (2001) describe the term 'knowledge management' as an odd couple, since knowledge cannot be managed, only people. KM is therefore a method of behavioural control.

They develop a four-field typology of management based on control/co-ordination modes of intervention and normative/behavioural domains of intervention: communal, socio-ideological, clerical and technocratic. Co-ordination is characterised as being weaker than control, and may be applied where authority is delimited, for example, over professionals. Technocrats favour plans and systems; socio-ideology represents leadership and questions of identity, relationships and vision; clerical co-ordination is conducted through information resources; communal co-ordination intervenes through morale and team-building.

Figure 41. Typology of Management (Source: Alvesson & Kärreman, 2001)

	Co-ordination	Control
Normative	Communal	Socio-ideological
Domain of intervention		
Behavioural	Clerical	Technocratic

They are interested in how practitioners articulate the term 'knowledge management' and develop a typology based on the co-ordination/control mode of intervention along with a social/technostructural mode of intervention. A matrix emerges featuring: KM as extended library or information exchange, based on a bureaucracy and coherence; KM as a community of shared ideas, a softer notion, often grounded in the idea of tacit knowledge; KM as normative control, emphasising corporate culture; KM as enacted blueprints, making tasks transparent through codified templates that minimise the amount of latitude that a practitioner needs or uses. "This means that organizations can gain leverage from relatively unskilled – and cheaper – workers" (p1007).

13.2 Theoretical Implications

13.2.1 Application of Critical Discourse to Established Fields

Contradictions: Tacit Knowledge & Competitive Advantage

Schultze and Stabell (2004) illustrate the unintended consequences of KM by applying discourse analysis to tacit knowledge, "the fascination of many knowledge management researchers", who think that it confers sustainable competitive advantage upon a firm.

Tacit knowledge is defined (p550) as "knowledge that is nonverbalized, or even nonverbalizable, intuitive, unarticulated" (Hedlund, 1994, p75). They point to an inherent contradiction in its treatment: it is unique to the firm, because it is not explicit, and therefore valuable; yet researchers (e.g. Nonaka and Takeuchi, 1995) recommend that to take advantage of it, a firm needs to render the knowledge explicit. At that point it is no longer unique. "Paradoxically, attempting to manage tacit knowledge would seem to destroy an organization's knowledge advantage (Barney, 1991; Kogut and Zander, 1992)" (p551).

The authors apply their four-discourse framework (dialogic, critical, constructivist, neo-functionalist outlined earlier) to tacit knowledge to investigate how it performs. The resource based view of the firm within the neo-functionalist discourse suggests tacit knowledge is a valuable asset, so that managing or explicating tacit knowledge is counterproductive, as un-taciting leads to loss of

advantage for the firm. Management of tacit knowledge does therefore represent a contradiction. Constructivist discourse insists that tacit and explicit knowledge are inextricably linked throughout the practice of knowing and learning. Tacit knowledge is not about competitive advantage or difference but is concerned with achieving 'sameness' of knowledge based within the organisation. Duality here means that there is no contradiction in managing tacit knowledge. In critical discourse, the balance of power between managers and workers is influenced by the mobilisation of workers' tacit knowledge. Managers need to give control to workers to if it is to be developed and utilised, while workers will lose opportunity for learning and development if they resist formalisation and manage their knowledge by hiding it. A conundrum. Finally, the authors link dialogic discourse to Foucault's 'technologies of the self', based on confession and self-examination. Tacit knowledge, once articulated, forms part of a cycle of reflection and self-improvement "a never-ending process of self-discovery" (p566) which does not present a contradiction.

Use of IS/IT, Foucault, Power and Surveillance

Foucault is the dominant thinker on power. His theories on surveillance have been applied to IS/IT, linking external control to internal correction and discipline (e.g. Doolin, 2004, Currie and Kerrin, 2004).

13.2.2 Actor-Network Theory

Actor-network theory (ANT) was developed by science and technology academics Michel Callon (e.g. 1992) and Bruno Latour (1987, 2005) and the British sociologist John Law (e.g. 1999). In features within this scoping review with little description of its theoretical basis and appears to be widely and variously interpreted.

According to Gherardi (2001, p137): "actor-network theory insists on treating human and non-human entities alike: they are all *actants*". "Actor-network theory and the sociology of science and technology entirely dissolve the concept of context, although they retain the idea of situatedness. ... 'actors are network effects'; they acquire the attributes of the entities which they include (Law, 1999). The latter operation comes about through the idea of 'performativity': if entities (human or non-human) achieve their form as a consequence of the relations in which they are located, and if relations do not hold fast by themselves, then they have to be performed in, by and through those relations" (p135).

"The study of knowing in practice can follow the same methodological principle stated by Latour (1987) for the analysis of science as practice: 'follow the actors' in order to identify the ways in which they associate the various elements that make up their social and natural world. Latour draws this principle from ethnomethodology and from Hughes's (1971) slogan 'follow the actors': an injunction taken up by Callon (1980) and then by Latour (1987), who, to explain science in action, followed scientists and their work practices, as well as the specific practices of representation with which they described the world" (Gherardi, 2001, 136).

Fads, Fashions and Actor-Network Theory

Ekbia and Hara (2008) apply actor-network theory as a means of understanding the different approaches taken by practitioner and scholarly literature: actors will supply different performances, depending upon their audience. Their enquiry was

stimulated by the cyclical model of progress “whereby new concepts emerge amidst excitement only to be followed by critique and then transformation or decline within a matter of a few years (Hirsch and Levin, 1999)” (p2). The review critiques popular writing, consistent with Benders and Van Veen’s (2001) examination of the ‘management fashion’ of business process re-engineering excited by Hammer and Champy (1993).

Popular books (e.g. Pfeffer and Sutton, 1999; Wenger, McDermott and Snyder, 2002) were selected to represent the practitioner literature. They were found to be written by professional consultants or by academics holding consulting jobs, and their audience comprised other consultants or executives. Ekbja and Hara analysed their content as ‘black-boxing’ success stories with little analysis of evidence or cause and effect. They produce an optimistic version of KM for consumption by consultants and managers. There is some resonance here with Newell *et al*’s (2000) model of diffusion, described in the KT domain.

13.3 Exemplar Papers

13.3.1 Most Cited – Contradiction Between Knowledge & Management

Box 28. Abstract from Alvesson and Kärreman (2001)

The idea of knowledge management draws currently much attention, both among practitioners and scholars. Advocates of the term argue that knowledge management points to a new set of phenomena and practices for managers to learn and master. In particular knowledge management focuses on the creation and distribution of knowledge in organizations through technological novelties such as the internet, intranets, and e-mail, although there are also streams concentrating on social relations and interactions. This paper examines several possible conceptualizations of the idea of knowledge management. It is argued that knowledge is an ambiguous, unspecific and dynamic phenomenon, intrinsically related to meaning, understanding and process, and therefore difficult to manage. There is thus a contradiction between knowledge and management. Drawing from a literature review and a case study, it is suggested that knowledge management is as likely, if not more so, to operate as a practice of managing people or information than as a practice attuned towards facilitating knowledge creation.

Alvesson and Kärreman consider an empirical case study of a knowledge intensive firm of mostly young consultants. KM consists mainly of databases and documents available on the computer network. In describing what they meant by KM, consultants tended to give a broader gloss to the term. The authors judged that the company technology is symbolic of the firm’s cutting-edge capability within its shared ‘delivery culture’. It functions as an element of normative control, and is more useful in communicating cultural ties than in operating as a management tool on a day to day basis.

The authors are self-conscious about “the academic sins ... of scepticism, negativity and looking at ideas in an intellectual rather than practical context”. Though they suggest that “there is nothing inherently positive about knowledge talk (except for academics having stakes in it)” (p1014), they attempt to be upbeat in suggesting that knowledge is a good management buzz-word that offers potential for creative and thoughtful space. They nevertheless conclude that knowledge is too diffuse a concept to be properly managed, and that perhaps the rhetorical appeal of the term ‘knowledge management’ is that it promises to

manage something that simply cannot be managed. Rather, it is the workers who are managed.

13.3.2 Interesting – Healthcare Application

Box 29. Abstract from Currie & Kerrin (2004)

Our paper examines issues of epistemology, power and culture with respect to their impact upon the use of information and communication technology (ICT) to manage knowledge within an organization. Utilizing an empirical case study of a global pharmaceutical company, in which the implementation of an intranet failed to meet aspirations of the Chief Executive that employees freely share knowledge, we encourage academics and practitioners to reflect more critically upon the limits to technology in pursuit of knowledge management. Our study illustrates that 'technical fixes' to knowledge management issues merely harden existing practices and routines, rather than open up new directions. In particular, broader organizational issues of power and culture may mean that employees are unwilling or unable to share knowledge and, beyond the epistemological problem, this is likely to further inhibit the contribution of ICT to the management of knowledge. **Key Words:** culture; epistemology; intranet; knowledge management; power

Currie and Kerrin's paper highlights the critical theorist antipathy towards IS/IT as a tool of control. They argue that "using ICT, rather than a solution to knowledge management, may represent 'the great trap in knowledge management' (McDermott, 1999: 104)" (p10). Power and cultural factors played a role in preventing staff from sharing knowledge. Specifically, "the exercise of power by employees, located in a wider tension between labour and capital, may still render ICT ineffective for the purpose of knowledge sharing" (p11).

The Chief Executives view was that:

"A more efficient way of learning would be to wire all employees' brains together to produce one super brain. We can design this into the organization via the intranet to encourage the sharing of learning" (p21).

This was contrasted with an employee's view:

"The experience I have built up over the years is knowledge the organization needs. They have to keep me if they want to benefit from my years of experience. They can't replace me with a young kid and I'm certainly not going to help them do so by giving away to a young kid what I have learned through my years of experience" (p22)

Currie and Kerrin argue that "there appears a clear need for a more political theoretical contribution that addresses the potential hegemonic effect of knowledge management systems, but which also recognizes the scope for employees to resist these forces" (p26).

14. Anthropology, Culture and Conversation (Phase 1 Management Literature)

This domain is intended to capture culture, conversation management and ethnographic studies of knowledge. The pragmatic, rather than dualist, process of categorisation process is pertinent here since the subject matter is not mutually exclusive to other domains. Much of it fits elsewhere. Culture is one of the main barriers to knowledge sharing. Ethnography as a methodology is not commonly used in other domains, but there are examples such as Marshall (2008) in Organisational Learning and Ambrosini *et al* (2001) who operationalise tacit knowledge through ethnographic and other methods in the context of the Resource Based View of the firm. It is the smallest of the ten domains in the Phase 1 management literature review.

14.1 Communication

14.1.1 Culture and Communication

Al-Alawi *et al* (2007) define culture as:

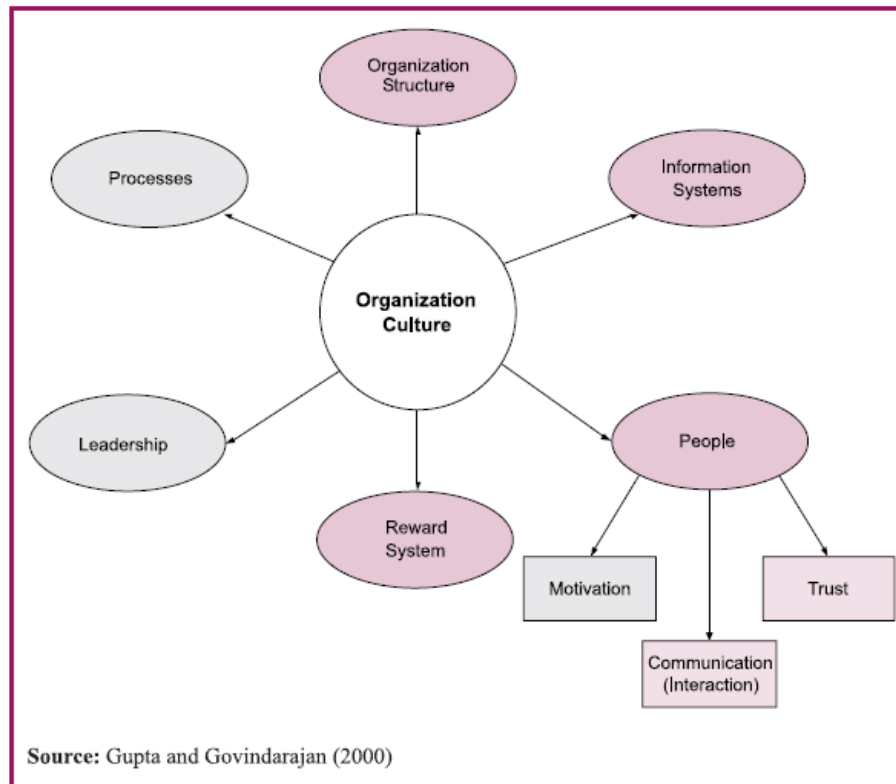
the shared, basic assumptions that an organization learnt while coping with the environment and solving problems of external adaptation and internal integration that are taught to new members as the correct way to solve those problems (Park *et al.*, 2004; quoted in Al-Alawi, 2007, p24).

Conceptually, they link communication, trust and morale together as the 'people' dimension of organisational culture (see below). They found that factors such as communication between staff, information systems, interpersonal trust, rewards and organisation structure play an important role in defining the relationships between staff. Knowledge sharing is improved when relationships are good. A survey of communication techniques revealed the importance of formal and informal methods.

Table 16. Techniques that Emphasise Knowledge Sharing in Organisations (Source: Al-Alawi *et al*, 2007, p29)

No.	Knowledge sharing technique	%
1	Collaboration and teamwork	66.2
2	Training (either new or existing staff)	49.8
3	Formal and informal discussion	47.8
4	Utilizing knowledge sharing tools (e.g. e-mails, document management systems, groupware, intranet . . .)	45.3
5	Communication networks (internet, intranet and extranet)	44.3
6	Chatting during break time	38.8
7	Brainstorming	36.3
8	Workshops	34.8
9	Seminars	25.4
10	Conferences	21.9
11	Focus groups	18.9
12	Quality circles	17.4

Figure 42. Framework for Organisational Culture



14.1.2 Organisational Communication

Communication studies have entered this scoping review because it is a medium of knowledge sharing. Computer-mediated communication (CMC) lends itself to empirical analysis because transactions can be tracked and quantified. The methodology is the antithesis of Carlile's (2002) ethnographic study which demanded that he hang around a factory most of the week over the course of a year to observe interactions.

Van den Hoof & Ridder (2004) analysed questionnaire responses from 444 employees in 6 case study organisation. They found a positive link between 'communication climate' and knowledge donating, knowledge collecting and affective commitment to the organisation. Affective commitment is related to identification and involvement with the organisation and feelings of emotional attachment; it links to individuals' willingness to commit extra effort to their work, and so to share knowledge.

14.1.3 Conversation Management

Mengis and Eppler (2008) conduct a detailed literature review on the role of face-to-face conversations for social knowledge processes and sense making in organisations. They ask the question "how can conversations be managed to foster developments in organisational knowing?" and propose a management framework for conversations "as the face-to-face interactions within a small group of co-located people, interacting through verbal and non-verbal means" (pp1290). Some conversations would not benefit from explicit rules of structure, e.g. informal coffee-break discussions, free-form break-out sessions or very personal and emotional discussions. However, they suggest that explicit conversational rules would add structure and purpose to many face-to-

face conversations that are intended to convey organisational knowledge.

Figure 43. Key dimensions and questions of conversation management

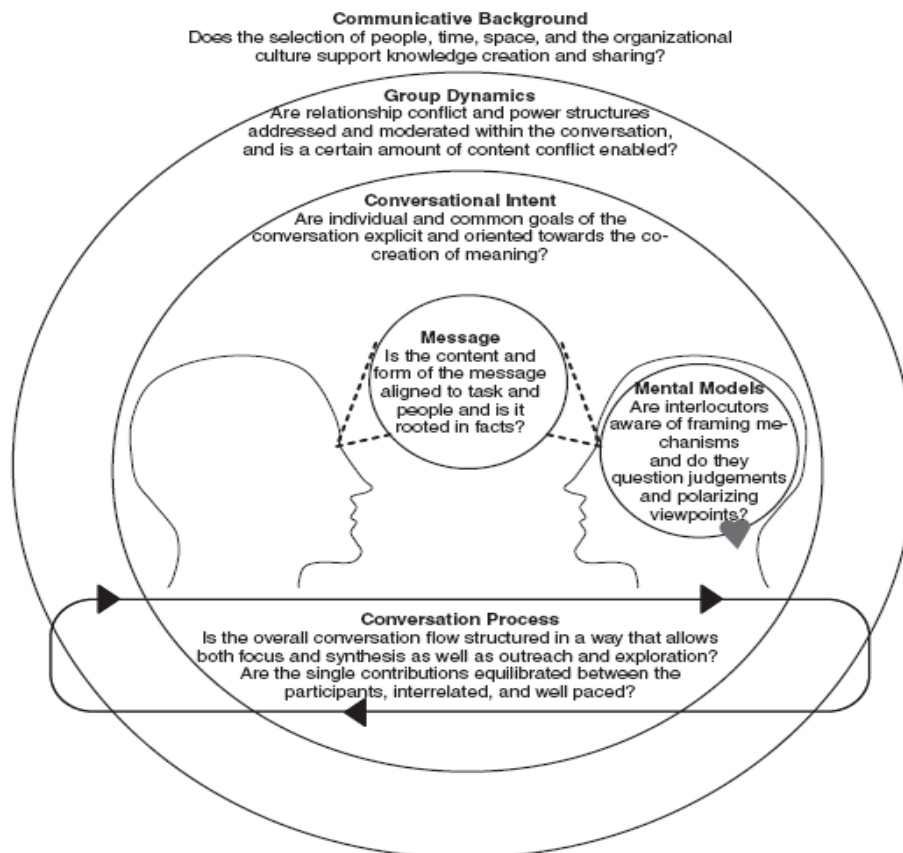
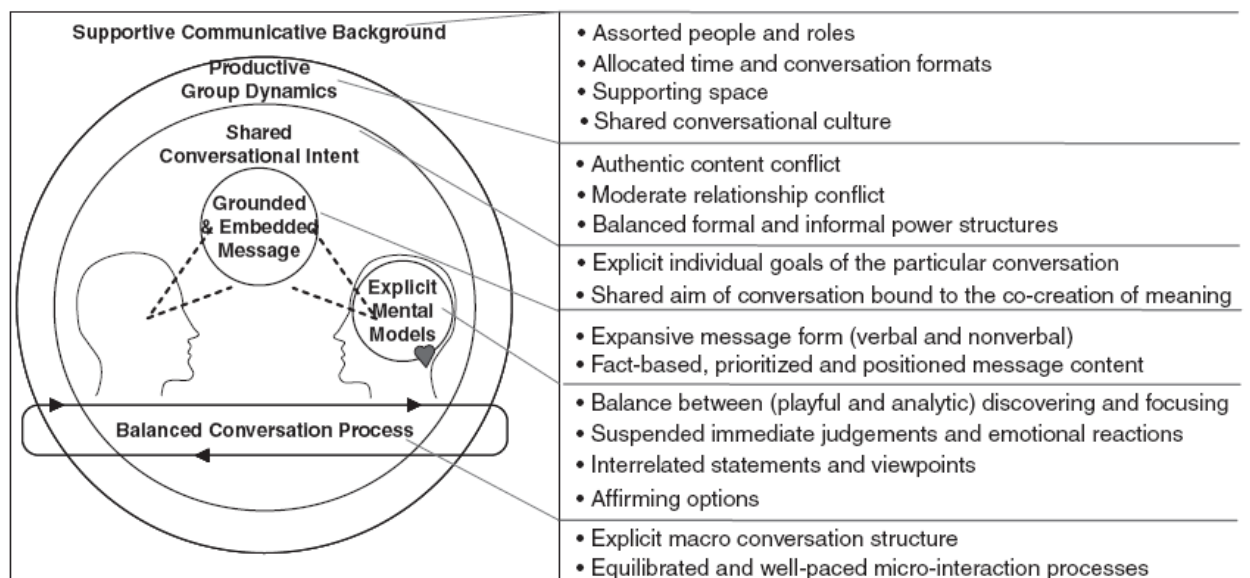


Figure 44. A framework for the management of knowledge-intensive conversations in organisations



14.2 *Ethnographic Study*

Carlile (2002) conducted a year-long ethnographic study to consider the structure of knowledge within four primary functions in product-development (sales/marketing, design engineering, manufacturing engineering and production) and went on to look at interaction and spread across boundaries in product development.

Carlile uses an anthropological approach by observing people in a manufacturing firm for three to four days every week for a year in 1994/1995. He wants to find out how knowledge is structured and moved by taking 'objects' that people use, e.g. machines, and 'ends' or outcomes, e.g. signed sales contract. The firm makes fuel valves for automobile manufacturers. After data was collected during more than 150 days of fieldwork, Carlile faced the challenge of how to present it in manageable form. He summarised objects and ends across practices based on a series of vignettes:

- Ken in Sales Work wants to get the numbers 'right'
- Vaughn in Design Engineering Work wants to get the prototype to pass 'Spec'
- Mick in Manufacturing Engineering Work wants to build a high-volume machine
- Jim in Production Work wants to get the product 'out the door'

The boundary between Mick and Vaughn showed that Mick would turn up to meetings with drawings that were not up to date, rendering them useless in discussions with Vaughn, who was convinced by none of Mick's arguments. The draughtsmen had not got to grips with new CAD software to update drawings in time. Eventually they did, but with only 8 weeks left to the prototype deadline. Mick went through the old arguments about what needed to be changed, but this time with proper drawings, so Vaughn was convinced by the detail and worked on a new solution. It came together in the end, with a successful design. The key to the outcome was the match between the revised shareable 'object' of design drawings and shareable 'end', which allowed Mick to show what was 'at stake'. The revised drawings changed them from a 'within practice' object to an 'across practice' or 'boundary' object.

Carlile observes three sets of boundary objects: repositories, e.g. data bases; standardised forms and methods; objects, models and maps. He identifies three characteristics that make for good rather than bad boundary objects. First, it establishes a shared syntax or language for individuals to represent their knowledge. Second, at a semantic boundary it provide a concrete means to learn about differences and dependencies. Third, at a pragmatic boundary, the boundary object facilitates a process that allows knowledge to be transformed. 'Objects, models and maps' allow this to happen. Carlile argues that a pragmatic view of knowledge and boundaries demands research on the 'challenge of knowledge representation' in organisations.

14.2.1 Exemplar Paper – Most Cited

Carlile's (2002) study described above is the most cited within the small domain described in this chapter. The methodology of ethnography, using observation, is unusual in the field of KM and offers insights by potentially breaking new ground.

Box 30. Abstract from Carlile (2002)

This study explores the premise that knowledge in new product development proves both a barrier to and a source of innovation. To understand the problematic nature of knowledge and the boundaries that result, an ethnographic study was used to understand how knowledge is structured differently across the four primary functions that are dependent on each other in the creation and production of a high-volume product. A pragmatic view of "knowledge in practice" is developed, describing knowledge as localized, embedded, and invested within a function and how, when working across functions, consequences often arise that generate problematic knowledge boundaries. The use of a boundary object is then described as a means of representing, learning about, and transforming knowledge to resolve the consequences that exist at a given boundary. Finally, this pragmatic view of knowledge and boundaries is proposed as a framework to revisit the differentiation and integration of knowledge

15. Nature of Knowledge and Knowing (Phase 1 Health Literature)

The health literature in this domain does not use a unified vocabulary. In trying to develop a taxonomy, the terminology features: 'knowledge' ('nature and meaning of knowledge' in relation to doctors, Prosser and Walley *et al*, 2006), 'best practice' (Perleth, Jakubowski *et al*, 2001), 'research' (Russell and Greenhalgh *et al*, 2004), but most often 'evidence' (e.g. Dobrow & Goel *et al*, 2004; Lambert, 2006; Goldenberg, 2006; Dobrow & Goel *et al*, 2006).

Although we have identified a separate stream of literature around the evidence-based approach (which was dominant between 2000-2003) some of it spills into 'nature of knowledge and knowing' when it tries to get to grips with questions such as 'what constitutes evidence?' The epistemological turn is recent, and out of the 12 papers in this domain, 11 were published from 2004 onwards.

None of the health papers was explicitly concerned with either the meso or organisational level, featuring instead individual practitioners, communities or the policy level. This is a major contrast with the generic management literature, which is predominantly concerned with the organisation. Nor were any of the papers interested in management. Health care systems, medicine or clinicians were the focus of interest.

15.1 Evidence as Knowledge

15.1.1 Hierarchy of Evidence

The hierarchy of evidence underpinning an evidence-based approach is set out below as a point of reference. It sets systematic reviews and meta analyses of RCTs as the highest form of evidence and personal experience as the lowest.

Box 31. Hierarchies of evidence. (Source: Davies, H. T. O. and S. M. Nutley (1999). 'The Rise and Rise of Evidence in Health Care', *Public Money & Management*, 19 (1), pp. 9–16, quoted in Tranfield *et al*, 2003)

Hierarchy of evidence

- I-1 Systematic review and meta-analysis of two or more double blind randomized controlled trials.
- I-2 One or more large double-blind randomized controlled trials.
- II-1 One or more well-conducted cohort studies.
- II-2 One or more well-conducted case-control studies.
- II-3 A dramatic uncontrolled experiment.
- III Expert committee sitting in review; peer leader opinion.
- IV Personal experience.

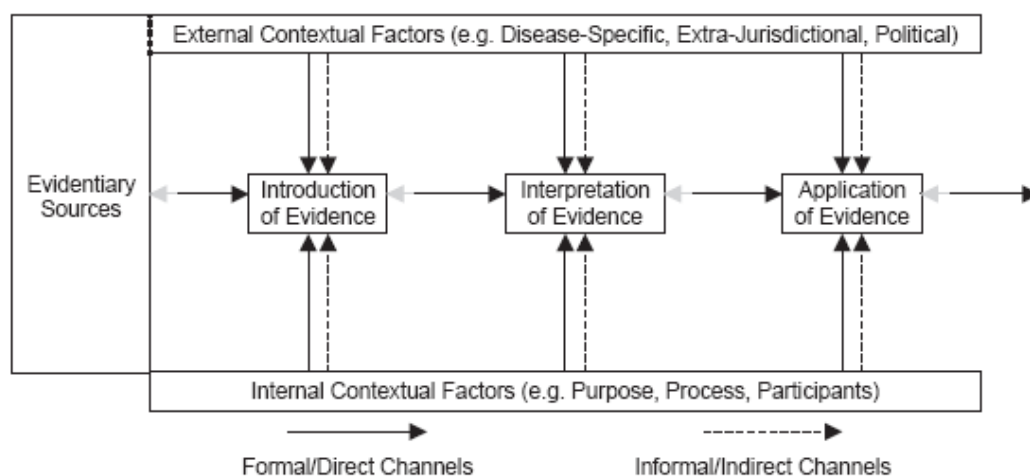
15.1.2 Role of Context on Evidence and its Utilisation

Dobrow, Goel and Upshaw (2004) try to get to grips with "what constitutes

evidence?” by looking at “how we relate to the world in terms of the creation, interpretation and evaluation of information and knowledge” (p208). Their distinction between evidence and context is a helpful analytical device.

They contrast two orientations towards evidence as philosophical-normative and practical-operational, each of which reflects a fundamentally different relationship with context. The philosophical-normative is the most pure and ideal and is unconstrained by context. The practical-operational is pragmatic and completely responsive to context and, as an orientation, characterises evidence as emergent and provisional in nature. The authors do not seek to define context, but look at how context impacts upon decision-making. The level of analysis is micro, at the level of practitioner, and macro at the population level. They contrast internal processes addressing ‘why?’ ‘who?’ ‘how?’ questions, relating to treatment methods, with the external decision-making context of the environment in which a decision is applied.

Figure 45. External and Internal Contextual Factors Applied to Evidence



Dobrow, Goel, Lemieux-Charles, and Black (2006) went on to consider the impact of context upon evidence utilisation. They used embedded multiple case study design to study how four expert groups formulated policy recommendations for breast, cervical, colorectal and prostate cancer screening in Ontario, Canada. They found that the same research does not necessarily produce the same recommendations. They concluded that the challenge is not in developing evidence but in finding methods to interpret and apply it. ‘Utilisation’ marks the critical interaction between evidence and context.

15.1.3 Limitations of Evidence

More recent examinations of ‘what constitutes evidence?’ tend to produce a critique of EBM. Goldenberg (2006) is unequivocal: “The evidence-based medicine (EBM) movement is touted as a new paradigm in medical education and practice, a description that carries with it an enthusiasm for science that has not been seen since logical positivism flourished (circa 1920–1950). At the same time, the term “evidence-based medicine” has a ring of obviousness to it, as few physicians, one suspects, would claim that they do not attempt to base their clinical decision-making on available evidence.” Goldenberg moves that “the apparent obviousness of EBM can and should be challenged on the grounds of how ‘evidence’ has been problematised in the philosophy of science. EBM enthusiasm, it follows, ought to be tempered.” Post-positivist, feminist, and phenomenological philosophies of science, she contends, contest the nature and authority of evidence. EBM is not context-free in its application and cannot be

divorced from questions of medical power and authority.

Lee and Garvin (2003) explore the power dimension through exchanges between physicians and patients in Appalachian communities in the US. The dynamic of doctors as purveyors of knowledge and patients as receptacles, able to act on the information given, was observed and criticised. They argue that use of expert language (Margolis, 1996) controls discourse through construction of knowledge hierarchies and information boundaries. It contributes to a bias in favour of expert rather than lay knowledge where the provider of information is the expert and the user is the lay person. In healthcare this is apparent in the physician-patient environment (Falkum & Forde, 2001; Roberts & Aruguete, 2000); the public health professional-public arena (Lupton, 1995; Pederson & Signal, 1994); and between scientists and decision makers in the policymaking environment (Garvin & Eyles, 2001; Margolis, 1996; Harrison & Hoberg, 1994).

Lambert (2006) is also scornful of EBM and sets out 6 limitations in Box 32.. They form a critique of EBM in particular and use of guidelines in general, being out of sympathy with the analysis of ‘best practice’ undertaken by Perleth, Jakubowski *et al* (2001) (discussed later). If we compare the list of limitations with the hierarchy of evidence in Box 31, then the role of the patient voice is key to criticisms. Personal experience ranks lowest on the hierarchy of evidence whereas critical literature demands that it is given greater credence.

Box 32.

Limitations of EBM identified in critical literature

1	Incommensurate nature of population evidence and individual patient profiles
2	Bias towards individualised interventions
3	Exclusion of clinical skills from medical practice
4	Production of formulaic guidelines
5	Failure to consider patient views and narratives
6	Difficulties in disseminating & implementing evidence into practice

‘Failure to consider patient views’ and exclusion of ‘patients voices’ especially in the form of ‘narrative’ highlights the apparent polarisation between EBM and narrative methods, (discussed in the management literature by Tranfield *et al*, 2003). Lambert recalls that “[r]ecent meetings on Medicine and Narrative in the UK convened by reputable bodies such as the Drugs and Therapeutics Bulletin and the British Medical Association have featured sometimes fervent denunciations of EBM as dehumanising and calls for an explicitly resistant stance to EBM’s incursions in favour of the putatively gentler, more patient-centred practice of ‘Narrative-Based Medicine’ (NBM).” (2640)

It is paradoxical, she observes, that the gold standard of randomised control trials in EBM is taking hold at a time when qualitative research strategies are increasingly legitimised in the social sciences. “Narrative is simply one form of non-quantitative material that could, in an alternative or expanded representation, be construed as ‘evidence’.”

Gabbay and Le May (2004) observed clinicians in the UK and found that doctors do not behave in accordance with the hierarchy of evidence. Freeman & Sweeney (2001) also showed an awareness among general practitioners of language, power and experience as inhibitors to implementing evidence based

medicine. Patient experience and context play a greater role in each of these UK studies than would be suggested by either EBM or Lee and Garvin's (2003) case studies of rural communities in the US.

15.2 Other Formulations of Knowledge

15.2.1 Best Practice

Perleth, Jakubowski *et al* (2001) devised a systematic framework for the classification of information, linking 'best practice' to effectiveness and efficiency in health care systems. They reviewed the literature in order to (1) establish a definition for 'best practice' in the health sector, (2) develop a framework to classify relevant information, and (3) synthesise the literature on activities, disciplines and methods pertinent to the concept. 'Best practice' was broken down into three activities (Health Technology Assessment (HTA), Evidence-Based Medicine (EBM), Clinical Practice Guidelines (CPGs)) by which evidence is synthesised either as an evidence base (EBM and most HTA) or in the form of recommendations (CPGs and some HTA) for different decision purposes in health care. They found that these activities gained input mainly through four disciplines: clinical research, clinical epidemiology, health economics and health services research. What constitutes 'best practice' proved to be illusive, and they found that HTA, EBM and CPG was most easily described by process, providing evidence on "(a) the (potential) effects of health care interventions and policies; (b) on ways to implement them; and (c) on ways to monitor their actual outcome".

15.2.2 Systematic and Narrative Approaches

Whereas Tranfield *et al* identify narrative and systematic reviews as opposing methodologies, Greenhalgh *et al* (2005) argue for a "meta-narrative" approach as a hybrid form of systematic review. The polarity between narrative and systematic approaches is apparent in the health literature (e.g. Lambert, 2006). Greenhalgh *et al*'s method appears to fuse both narrative and systematic approaches.

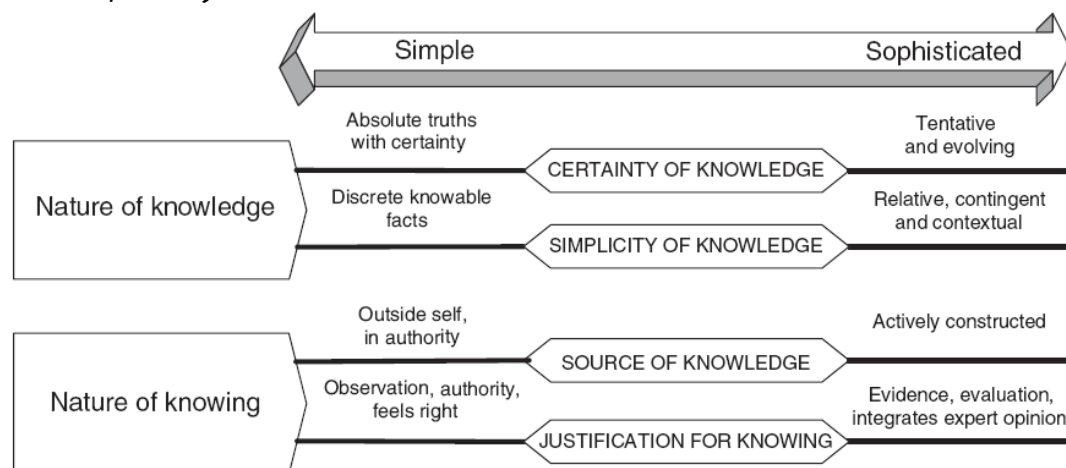
They draw on Kuhn's (1962) notion of scientific paradigms to interpret 1024 literature sources. The researchers took "the unfolding 'storyline' of a research tradition over time" as the unit of analysis and identified 13 key meta-narratives from literatures that covered disciplines of rural sociology, clinical epidemiology, marketing and organisational studies. Pursuit of different research traditions exposed apparent contradictions in the findings of different scientists who had "investigated the 'same' problem" but from different directions. They were able to make sense of the data "by systematically exposing and exploring tensions between research paradigms as set out in their over-arching storylines".

15.2.3 Developmental Model

Knight and Mattick (2006) examined ways of knowing among medical students by mapping personal epistemologies against a developmental framework. They found that students at first expressed simplistic, unreflective thinking based on high levels of certainty and 'belief' obtained by direct observation. "Beliefs need no justification: one must only observe to know". This gave way to reliance on expert knowledge provided by authorities. The quasi-reflective stage accommodated uncertainty and the contextual nature of knowledge. The

reflective stage conceded that knowledge is interpretive and that 'ill-structured problems require solutions to be constructed', using probabilistic estimates rather than certain beliefs. The process of professional identity formation and personal epistemology grew in tandem, linking scientific and experiential ways of knowing. Nature of knowledge and ways of knowing are interrelated, showing the interplay between experience and knowledge. Knight and Mattick describe a trajectory from simple to sophisticated.

Figure 46. Nature of Knowledge and Knowing (Source: Knight and Mattick, 2006)



16. Evidence Based Health Care (Phase 1 Health Literature)

One third of this Stage 1 search of high impact journals and authors in the health field produced papers on evidence based medicine, management and policy. The peak year was 2001, near the beginning of our search period. Most papers were concerned with clinical evidence and, by 2008, the terminology had changed so that 'translational research', along the pathway from bench to bedside, was favoured over 'evidence based'.

In the management journals there was only one paper that dealt with Evidence Based Medicine (EBM) or Evidence Based Management (EBMgt) (Tranfield *et al*, 2003, discussed in Section 5), taking a methodological slant. The terminology marks a distinction between health and management journals. 'Evidence' and 'research' in health contrast with 'knowledge' in management. EBM/Mgt is identified as a health-specific activity, having no corollary in the general management sphere.

The content of the papers (as also found by Greenhalgh *et al*, 2005) suggest that in 2001 the baton was passed from EBM, which had gained momentum in the 1990s, to EBMgt and Evidence Based Policy (EBP). The three levels of evidence based health care are discussed here: medicine, policy and management, after a reprise of terminology.

16.1 Terminology

Evidence-based approaches are described as "health policy and health care delivery driven by systematically collected proof on the effects of health-related interventions from the social and health sciences" (Niessen *et al*, 2000, p859). The movement became prominent in the 1990s nationally and internationally. At the policy level, there was a drive to use scientific evidence on the burden of disease to set priorities and to make rational decisions based on equity and cost-effectiveness of interventions.

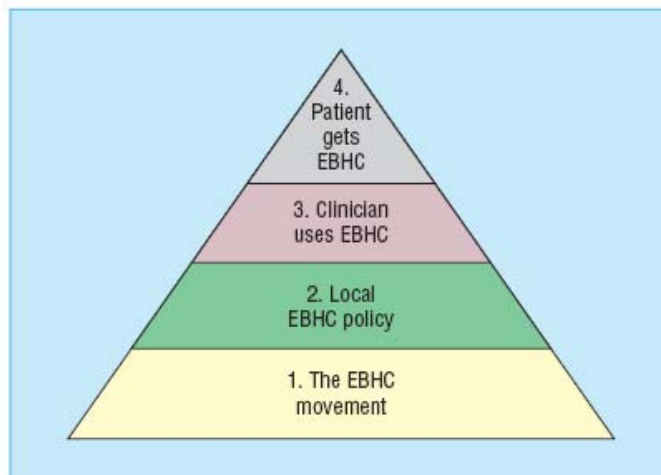
The distinction between clinical effectiveness guidelines and evidence based medicine has been characterised as top down (guidelines, e.g. via the Royal Colleges) versus bottom up EBM decision-making by individual clinicians (Davies *et al*, 2000).

16.2 Evidence Based Medicine

Research on application of EBM made it clear that public health specialists were more likely to be influenced by evidence-based guidelines than were consultants in hospitals or GPs in primary care (Coleman & Nicholl, 2001). It was over-optimistic to expect doctors to change their practice on the basis of evidence, since what constitutes 'evidence' is not straightforward and, secondly, there was no evidence that dissemination of evidence was itself enough to persuade people to change (Dopson *et al*, 2001).

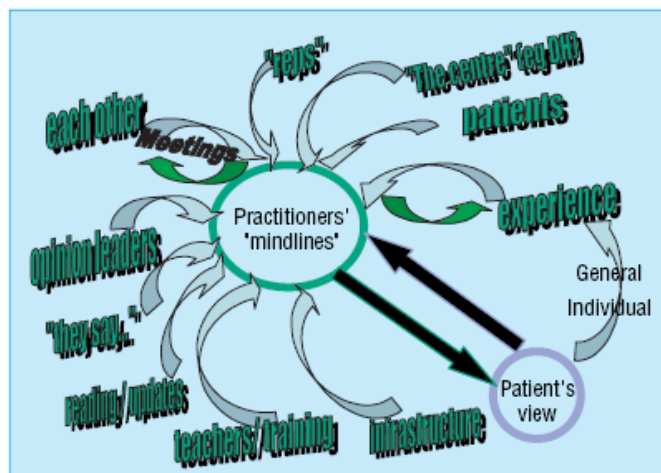
Papers on evidence based medicine from 2001 have described barriers to implementation or, increasingly, translation (e.g. Rich, 2002). Freeman & Sweeney (2001) analysed barriers to implementing evidence among general practitioners. They reported a qualitative empirical study based on groups of 19 general practitioners and identified six types of barrier based on: experience, relationship (with patient), perceived tension (with hospital physicians), feelings,

use of words (power in the relationship with patient), logistics. They concluded that general practitioner participants “regard clinical evidence as a square peg to fit in the round hole of the patient's life. The process of implementation is complex, fluid, and adaptive.” Gabbay and Le May (2004) endorsed this with an ethnographic study of primary care clinicians who, they found, rarely used explicit evidence but used tacit ‘mindlines’ based on social interaction. The study also pointed out the parallel developments in KM literature that rejected linear models of explicit knowledge uptake in favour of ‘knowledge in practice’ and collective ‘sense making’ (p329). It is an example of “cross-over” between general management and health literature.



Four levels of evidence based health care

Figure 47. The hierarchical view of Evidence Based Health Care (EBHC), Source: Gabbay and Le May (2004)

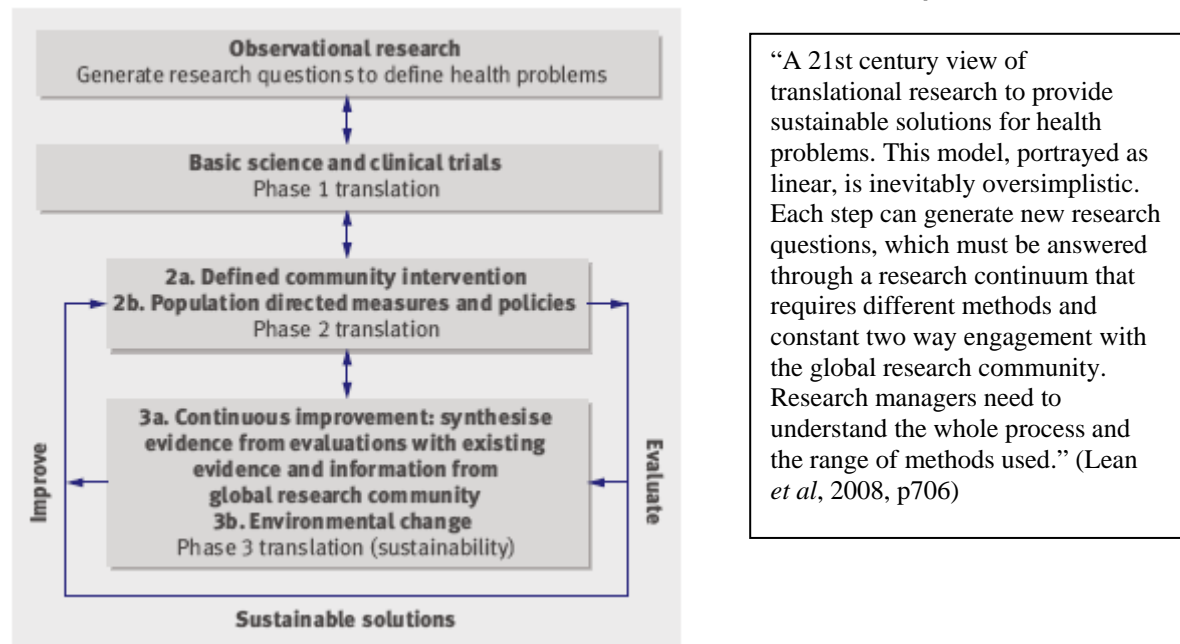


Construction of mindlines

Figure 48. Influences that create mindlines among primary care clinicians. Source: Gabbay and Le May (2004)

Rather than reject the notion of EBM, on the basis that “study after study has demonstrated disconcertingly low rates of compliance” Rich (2002, p1321), the research, educational and policy establishment has persisted in trying to implement best evidence. Glasziou *et al* (2008) suggest that “the search engine is now as essential as the stethoscope” and recommend that evidence based medicine is incorporated into the medical curriculum. “Translational research,” from bench to bedside, is the “21st century view” (Lean *et al*, 2008), accepting the non-linear passage of research evidence into practice, and suggesting a broad scope, e.g. ‘translational medicine’ and ‘translational health strategy’.

Figure 49. Translational Research Model (Source: Lean *et al*, 2008, p706)



Facilitators to use of evidence and guidelines have also been studied. Dopson *et al* (2001) found that local negotiation and adaptation of research evidence to local context was important. Ouimet *et al* (2006) considered use of clinical guidelines in health ministries, regional health authorities and hospitals in Canada. Facilitators at all three levels included people who 'have a positive attitude toward research,' 'spend at least some time doing clinical practice', and 'have frequent person-to-person contacts with researchers' in the health system (p973). NICE guidelines in the UK were more likely to be implemented where there was "strong professional support, a stable and convincing evidence base" and "where the professionals involved are not isolated" (Sheldon *et al*, 2004, p1). Again the study found that "guidance needs to be clear and reflect the clinical context" (p1).

16.3 Evidence Based Policy

While the studies of clinical practitioners suggested EBM was not a functioning model, the policy level would appear to offer greater scope since evidence-based decisions are strategic rather than in-the-moment applications of evidence. Nevertheless, Black's (2001) BMJ commentary introduced scepticism to the evidence-based debate, advising researchers to be "cautious about uncritically accepting the notion of evidence based policy". He suggested that research has little direct influence on policy and urged the use of an interactive model to describe the relationship between research evidence and policy. Researchers and policy makers are effectively two communities and greater mutual understanding was needed.

Complexity of the policy-making trajectory was illustrated by the Changing Childbirth policy, introduced in the 1990s on the basis of political and electoral requirements, and not on secure scientific grounds (Ferlie *et al*, 2000). Dobrow *et al* (2006) showed how the same research does not necessarily produce the same recommendations, suggesting that producing evidence is easier than interpreting and applying it, even at a policy level. The relationship between policy and the research community is considered further in Chapter 22.

16.4 Evidence Based Management

In their review of the evidence-based movement Walshe and Rundall (2001) shifted the research agenda from medicine to management. They charted the growth of evidence-based medicine (Sackett and Rosenberg, 1995), "prompted in part by the existence of unexplained wide variations in clinical practice patterns" (p430) and drew parallels in the field of management. They link EBMgt to the notion of 'knowledge management' (p431) and propose a list of reforms needed to effect a "paradigm shift of evidence-based health care" (p432).

The premise of the paper is that "evidence-based management seems to have made little or no progress in health care so far, at least in comparison with its clinical cousin" (p437) and provide examples of overuse, underuse and misuse/variation in research adoption to illustrate the research–practice gap in health care management:

- Overuse of strategies with a weak evidence base includes use of organisational mergers as a reaction to financial and service quality problems;
- Underuse of the evidence base includes limited replacement of doctors by other practitioners, especially in primary care and A&E settings, to provide routine health services;
- Misuse or variation in application of evidence includes use of community-based treatment schemes as an alternative to inpatient care.

Differences between medicine and management are analysed in terms of culture, research/evidence base, and decision-making processes. The professional and scientific culture of doctors stands in contrast with the world of managers. Doctors are aligned with the quantitative and positivistic nature of biomedical research where clinical decisions may be codified. Managers' decisions depend on pragmatism and subjectivity rather than research which is more often qualitative and in any case is perceived as contingent and not readily generalisable.

The differences between biomedical and social sciences highlight the divide between the two evidence bases which doctors and managers might be expected to draw on. One is experimental, replicable, and ostensibly generalisable and the other is non-replicable and contextual. "Because of the constrained, contested, and political nature of many managerial decisions, it may be difficult for managers to apply research evidence even when it is available." (p445)

Not to be daunted by these apparently irreconcilable worlds, Walshe & Rundall draw on US experience using the Center for Health Management Research (CHMR), a consortium of 12 health care organisations and 15 universities or "evidence-based management co-operative," as a potential model of practice for the UK.

The model appears to be consistent with the bench to bedside pathway drawn by Cooksey (2006) and the policy stream which followed, resulting in the recent formation of academic health science centres (see Chapter 2).

17. Information Systems & Technology

(Phase 1 Health Literature)

The papers in this domain represent 9% of the health literature in the Phase I search. All of the papers are concerned with clinical problems and focus mostly on clinical decision support.

17.1 Clinical Decision Support Systems (CDSS) and Systematic Reviews

CDSS are systems in which “characteristics of individual patients are matched to a computerized knowledge base, and software algorithms generate patient-specific recommendations” (Garg *et al*, 2005, p1223). They are used for many clinical situations, e.g. chest pain and administration of immunisations.

Two large scale systematic reviews clinical decision support systems came out in the same year. They both had similar results and have been heavily cited (124 and 221 citations according to Web of Science for Kawamoto *et al* (2005) and Garg *et al* (2005) respectively).

Kawamoto *et al* (2005) undertook a systematic review of randomised controlled trials to identify features of clinical decision support systems that improved clinical practice. Seventy studies were included (out of a hit list of 10688 potentially relevant articles) and decision support systems significantly improved clinical practice in 68% of trials. Four features were important: (a) decision support provided automatically as part of clinician workflow, (b) decision support delivered at the time and location of decision making, (c) actionable recommendations provided, and (d) being computer based. All these features make it easier for clinicians to use a clinical decision support system, suggesting that “an effective system must minimise the effort required by clinicians to receive and act on system recommendations”.

Garg *et al* (2005) found that CDSS improved practitioner performance in 62 (64%) of the 97 studies (out of a potential 3997 screened citations). The paper is described in detail below as it gives an insight into how systematic reviews are conducted.

Dorr *et al* (2007) undertook a systematic search of literature from 1996-2005 for evaluations of information systems used in the care of chronic illness. They evaluated design and quality plus other factors in relationship with process, quality outcomes, and health care costs. 109 articles were reviewed involving 112 information system descriptions and system users were primarily physicians, nurses, and patients. In keeping with the results of the RCT evaluations of CDSS they found that the majority (67%) of reviewed experiments had positive outcomes, correlated with “connection to an electronic medical record, computerized prompts, population management (including reports and feedback), specialized decision support, electronic scheduling, and personal health records. Barriers included costs, data privacy and security concerns, and failure to consider workflow.”

The consistency of positive results among the three studies considered here, i.e. 68%, 64% and 67%, is noteworthy. It suggests that two thirds of IS/IT clinical systems are worthwhile.

Detailed Example of a Systematic Review

Garg *et al* (2005)'s research questions were "(1) Do CDSSs improve practitioner performance or patient outcomes? and (2) Which CDSS and study level factors are associated with effective CDSSs?" The expectation was that better outcomes would be associated with automation, user training and potential bias in reporting through less rigorous study methods and evaluation by the developers.

Eligibility criteria were set for the review: "the CDSS had to provide patient-specific advice that was reviewed by a health care practitioner before any clinical action" (p1224), and studies were excluded, e.g. if they only provided computer-aided instruction.

A systematic search was conducted by an experienced librarian who accessed MEDLINE, EMBASE, Evidence-Based Reviews databases (Cochrane Database of Systematic Reviews, ACP Journal Club, Database of Abstracts of Reviews of Effects, and Cochrane Central Register of Controlled Trials), and Inspec bibliographic databases from 1998 through September 2004. The strategy used the terms *computer-assisted decision making*, *computer-assisted diagnosis*, *computer-assisted therapy*, *decision support systems*, *reminder systems*, *hospital information systems*, *randomized controlled trial*, and *cohort studies*. Eligibility of articles was evaluated by two independent reviewers, against the pre-set eligibility criteria, with arbitration by a third reviewer. If any reviewer considered an abstract to be potentially relevant, the full text of the article was retrieved.

Data was abstracted from all eligible studies, including study setting, study methods, CDSS characteristics, patient characteristics and outcomes. Studies were scored for methodological quality on a 10 points scale, taking account of method of allocation to study groups (e.g. random), unit of allocation (e.g. patient or practice), presence of baseline differences that could affect study outcomes (e.g. no reported baseline differences, baseline differences reported and statistical adjustment made), objectivity of outcome (e.g. blind vs. no blinding), completeness of follow up (e.g. (>90%, 0). The studies did not define a single outcome for statistical testing. The reviewers abstracted all reported practitioner performance and patient health outcomes. Data were described and analysed statistically.

There were 3997 screened citations, from which 226 full-text articles were retrieved and 100 trials met criteria for the review. Garg *et al* describe the study characteristics, e.g. 69% took place in the US and 14% in the UK; 69% reported to be publicly funded and 16% privately. The authors contacted authors of 91 trials to obtain extra data or clarification. The methodological quality assessment showed that 88% were randomised. 92% of trials enrolled physicians as primary users.

The paper summarises all 100 trials of CDSS, showing journal source, methods score (1-10), number of sites (ranging from 1 and 62), indication being measured (e.g. common mental disorders for outpatients), performance outcomes (e.g. rate of patient referral to mental health psychotropic medications, psychological consultations), patient outcomes (e.g. symptom score after 6 weeks), improvement in practitioner performance (yes/no as to whether at least 50% of outcomes showed statistically positive effects), improvement in patient outcomes (yes/no as to whether at least 50% of outcomes measured showed statistically positive effects; few studies had enough statistical power to show 'yes' here).

The review found that the majority of the 97 CDSS trials assessing practitioner performance (64%) improved diagnosis, preventive care, disease management,

drug dosing of drug prescribing. Barriers to implementation include “failure of practitioners to use the CDSS, poor usability of integration into practitioner workflow, or practitioner non-acceptance of computer recommendations”. Studies of systems which required automatic responses from users reported better performance than systems which needed the user to initiate action. Better performance was also described when the trial authors also developed the CDSS software, which could reflect greater motivation and support or selective publication of success. “Most of the CDSSs in this review were ‘home grown’ and the importance of local champions to facilitate implementation cannot be underestimated” (p 1235).

The authors considered strengths and weaknesses of the review. Inclusion of only English-language studies was a limitation. The use of 50% as an arbitrary measure of performance could underestimate the positive effect of some studies. Focus on CDSSs meant exclusion of more common but less rigorous before-after studies.

Garg *et al* conclude that the majority of CDSSs are not ready for mainstream use, since they have not been tested on multiple sites (over 60% use only one site). There is no evidence as to cost-effectiveness. They conclude that: “many CDSSs improve practitioner performance. However, further research is needed to elucidate the effects of such systems on patient health.” (p1236)

17.2 Human Impact of IS/IT

17.2.1 Impact of Technology on Behaviour and Cognition

At the beginning of the review period, Patel *et al* (2000) was concerned with the impact of a computer-based patient record system on data collection, knowledge organisation, and reasoning. They compared physicians' organisation of clinical information in paper-based and computer-based patient records in a diabetes clinic and then extended the study to include analysis of doctor–patient–computer interactions. Physicians' interactions were traced through interviews and analysis of the computer-based patient record. Findings suggested that technology had a major impact on physicians' behaviour and reasoning. The doctor-patient dialogue was influenced by the structure of the computer-based patient record system. Paper records encouraged a narrative structure, while the computer-based records were organised into discrete items of information. The main conclusion of the researchers was that there is a dynamic interaction between humans and technology and that IS/IT has cognitive and behavioural consequences.

By 2007, Staggers *et al* were “encouraged and excited to see the rise in systematic attention to human–computer interaction aspects of IT design.” They nevertheless issued a call to arms for informatics researchers to use theoretical frameworks and models to investigate usability of information systems, being mindful of individuals, tasks over time, and context.

17.2.3 Organisational Impact

“Technical success in implementing decision support systems may not translate directly into system use by clinicians,” according to Goldstein *et al* (2004); organisational context needs to be factored in. They describe the application of a “sociotechnical” approach to integration of ATHENA DSS, a decision support system for the treatment of hypertension, into geographically dispersed primary

care clinics in the US. The approach involved prior evaluation of barriers and facilitators for guideline implementation which they then addressed as part of their implementation plan. Barriers included: Administrative Approvals; Physician Acceptance of Clinical Content; Site Lead Physician without Informatics Skills; Interfacing with Local Hospital Information System Staff; Training Clinicians in Use of ATHENA DSS; Sustaining Clinician Interest; Site Lead Physician Confidence in ATHENA DSS.

17.2.3 Social *versus* Technical Systems

Russell and Greenhalgh (2004) examined the role of soft networks in bridging the gap between research and practice. Their empirical study contrasted informal, people-based knowledge with systematically codified knowledge accessible via IS/IT links into indexing services such as Medline, the Cochrane Library, and the National Electronic Library for Health. It explored the process of knowledge exchange in an informal email network for evidence based health care by tracking email messages in a network of 2800 practitioners. The researchers conducted interviews with core staff, undertook qualitative analysis of messages, postings from focus groups, and invited unsolicited feedback to the service. They found that the informal email network was useful in bridging the gap between research and practice, tapping in to members' experiences and ideas. "Critical success factors include a broad based membership from both the research and service communities; a loose and fluid network structure; tight targeting of messages based on members' interests; the presence of a strong network identity and culture of reciprocity; and the opportunity for new members to learn through passive participation." (p1)

18. Barriers to Transfer and Facilitators of Organisational Development (Phase 1 Health Literature)

We have identified a domain on barriers and enablers to utilisation of knowledge, in keeping with the management literature. Nevertheless, much of the earlier discussion of EBM and EBMgt concerns barriers to dissemination and translation, in terms of e.g. two worlds of communities of practitioner and researcher (Black, 2001; Innvaer, Vist *et al*, 2002); public health using evidence more overtly than local professionals (Coleman and Nicholl, 2001); behaviour, experience and cognition inhibiting evidence uptake among general practitioners (Freeman and Sweeney, 2001).

18.1 *Inventory of Barriers and Facilitators*

Box 33. Barriers and Facilitators to Knowledge Transfer and Exchange
(Source: Mitton *et al*, 2007, p 737)

Main KTE Barriers and Facilitators

Barriers	Facilitators
Individual Level	Individual Level
Lack of experience and capacity for assessing evidence	Ongoing collaboration
Mutual mistrust	Values research
Negative attitude toward change	Networks
	Building of trust
	Clear roles and responsibilities
Organizational Level	Organizational Level
Unsupportive culture	Provision of support and training (capacity building)
Competing interests	Sufficient resources (money, technology)
Researcher incentive system	Authority to implement changes
Frequent staff turnover	Readiness for change
	Collaborative research partnerships
Related to Communication	Related to Communication
Poor choice of messenger	Face-to-face exchanges
Information overload	Involvement of decision makers in research planning and design
Traditional, academic language	Clear summaries with policy recommendations
No actionable messages (information on what needs to be done and the implications)	Tailored to specific audience
	Relevance of research
	Knowledge brokers
	Opinion leader or champion (expert, credible sources)
Related to Time or Timing	Related to Time or Timing
Differences in decision makers' and researchers' time frames	Sufficient time to make decisions
Limited time to make decisions	Inclusion of short-term objectives to satisfy decision makers

In their review of knowledge transfer and exchange (KTE), Mitton *et al* (2007) summarised the barriers and facilitators that emerged (shown in the box above), acknowledging that it is perhaps “the most frequently addressed topic area in the KTE literature on health and policy decision making” (p735). At the organisational level, barriers include culture, competing interests, researcher incentive systems and frequent staff turnover. Facilitators include organizational capacity in terms of support, training, funding and technology, authority to implement changes, readiness for change and collaborative research partnerships at an organisational level.

Barriers mentioned in other sections of the report, usually at practitioner or policy level, include the impact of context upon utilisation of evidence (Dobrow, Goel *et al*, 2006) and the contested nature of knowledge and its sources (Davies, Nutley *et al*, 2008). Lack of personal contact between researchers and policy makers is among one of the most frequently reported barriers (Innvaer *et al*, 2002).

18.2 Models at Organisational Level

We report on models that identify barriers to research utilisation at organisation or system level.

18.2.1 System-Wide Facilitators and Enablers

Berwick (2003) makes 7 recommendations for speeding up diffusion of innovation: find sound innovators, find and support innovators, invest in “early adopters”, make early adopter activity observable, trust and enable reinvention, create slack for change, and lead by example.

Kilbourne *et al* (2004) describe system-level barriers at the level of organisation in translating evidence-based protocols to management of depression in primary care. They use empirical experience of the Robert Wood Johnson Foundation Depression in Primary Care Program and propose solutions to overcome the barriers, including for example:

- leadership – identify two or three key leaders and provide flow of information and incentives;
- decision support – regularly visit practices and create formal protocols;
- delivery system design – implement new systems such as scheduling routine screening and follow up to obtain current symptoms in advance of appointments;
- clinical information systems – where the registry is not up to date, create a separate registry with minimal data requirements.

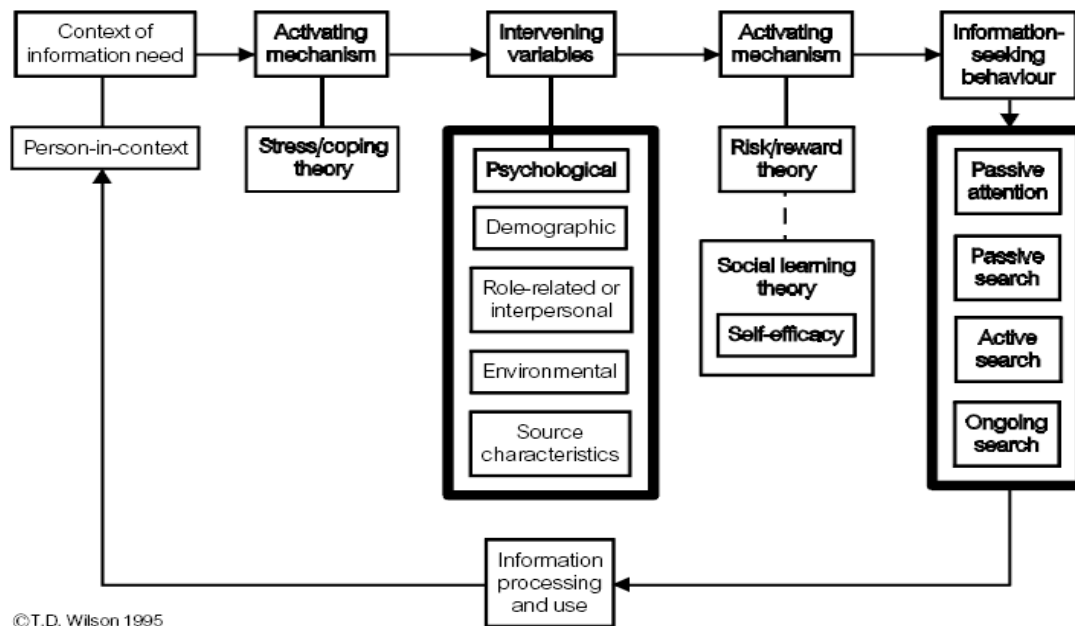
18.2.2 Information Seeking Behaviour and Barriers

Forsetlund & Bjorndal (2002) set out an information seeking model, based on Wilson (1995), to identify barriers. They were trying to understand why public health physicians seldom used research-based information and wanted to develop an intervention to remedy this. Barriers were categorised as:

- psychological - attitudes;
- environmental - attitudes in the environment as perceived by the public health physicians, lack of time, organisational variables including

decentralised organisation, no place to find out where to find out, no organised library services;

They did design an intervention but concluded rather mournfully that “the Norwegian public health physician works in an isolated environment which does not facilitate searching or obtaining scientific information, which does not ask for this information and far less encourages its use as a basis for decision making” (p10). They surmised that “their reward for doing so may not be worth their effort” (p17). In spite of their proposal, it appeared that incentives, which were not addressed by the intervention, would override other considerations.



19. Knowledge Translation & Transfer (Phase 1 Health Literature)

Knowledge transfer is about flows and processes. The equivalent domain name in the management literature is 'knowledge transfer and performance'. A more accurate title within healthcare is 'translation and transfer' since there is no emphasis in healthcare upon 'performance', but a strong focus upon moving research along the bench-to-bedside pathway.

The academic literature from 2003 onwards has used 'translation' and 'transfer' more and used 'evidence-based' less. The themes in the health literature move from a spectrum of medical to management. Terminology varies along the spectrum: translational research, knowledge translation, knowledge transfer.

19.1 Translation

19.1.1 Translational Research

"Translational research" is used in biomedical contexts (e.g. Rosenberg, 2003; Fontanarosa *et al*, 2003). Woolf (2008) gives two definitions of translational research. One is bench to bedside, "the interface between basic science and clinical medicine" in producing drugs and treatment options. The second is putting research into practice, i.e. making sure that patients get the right treatment options, whether they are drugs or better care co-ordination. Cooksey (HM Treasury, 2006) describes these as the two gaps in translation. In terms of this scoping review, the area is covered more extensively under "evidence-based medicine" (Section 16) and appears here by virtue of terminology. "Translation" implies a dynamic and teleological process whereas "evidence-based" signifies a rootedness. The vocabulary indicates how emphasis has changed over time.

19.1.2 Knowledge Translation

Knowledge translation is considered to be synonymous with knowledge utilisation, knowledge exchange, research transfer and research utilisation (Jacobson *et al*, 2003) and knowledge transfer, dissemination, research use, and implementation research (Graham *et al*, 2006). Davis *et al* (2003) describe knowledge translation in a clinical setting as a way of closing the gap between evidence and practice (Cooksey's second gap in translation). Tetroe *et al* (2008) describe lack of conceptual clarity as "the largest looming barrier to advancing the knowledge translation agenda" (p152) and demonstrates this lack of clarity "almost frighteningly" (p152) through twenty nine terms that were picked up through an empirical study.

The two communities theory of translation has been dominant (Webber, 1984; Caplan, 1979), in which researchers and policy-makers are pointing in different directions. The model has not gone away, in spite of criticism for being too pessimistic and self-fulfilling (Wingens, 1990; Dunn, 1983), but has taken a more interactive dimension, requiring policy makers and researchers to engage in reciprocal processes of exchange and learning, rather than expect a one-way transfer of ideas (Huberman, 1994; Lomas, 2000; Black, 2001).

Tetroe *et al* (2008) cite the Canadian Institute of Health Research's definition which is explicitly interactive: "the exchange, synthesis and ethically-sound application of knowledge – within a complex system of interactions between researchers and users – to accelerate the capture of the benefits of research for

Canadians through improved health, more effective services and products, and a strengthened health care system" (p126). Interactive models emphasise the personal nature of knowledge translation and the role of relationships (e.g. Bowen *et al*, 2005).

Box 34. Terms Used for Knowledge Translation : (Source: Tetroe et al, 2008, p137)

Terms Used for <i>Knowledge Translation</i> by Participating Funding Agencies (as Reported in Semistructured Interviews)	
applied health research	knowledge transfer
capacity building	knowledge translation
competing, cooperation, co-optation	linkage and exchange
diffusion	popularization of research
dissemination	research into practice
exploitation	research mediation
getting knowledge into practice	research transfer
impact	research translation
implementation	science communication
knowledge communication	teaching
knowledge cycle	the "third" mission
knowledge exchange	translation
knowledge management	translational research
knowledge mobilization	transmission
	utilization

Tetroe *et al* (2008) used Lomas's (1993) categorisation of knowledge translation into three types: diffusion, dissemination and implementation. Diffusion signifies passive and unplanned developments; dissemination is an active process to get the message across; implementation is an active process to ensure adoption and overcome barriers. The push-pull distinction (Lavis, McLeod *et al*, 2003) conceptualises supply of knowledge by agencies that try to diffuse and disseminate and demand for knowledge by users who have an appetite for knowledge.

Jacobson *et al* (2003) drew up a framework to fill a gap in understanding about the user context, based on a literature review. It consists of five domains: the user group, the issue, the research, the knowledge translation relationship, and dissemination strategies; and entails of a checklist of questions under each heading, e.g. "to whom is the user group accountable?" (p95). It is based on a hypothetical scenario of one researcher and one user group and the aim is to raise awareness among researchers about factors that would assist in translating knowledge.

19.2 *Transfer*

Models of knowledge transfer tend to be derived through analyses of literature. They are advanced as conceptual frameworks that need to be tested through further research. Mitton *et al*'s (2007) review of KTE models (interactive processes involving the interchange of knowledge between research users and

researcher producers, p729) found that only about 20% of the studies they examined were reporting on a 'real-world application of a KTE strategy, and fewer had been formally evaluated. The non-implementation literature identified four major themes: "(1) organisation frameworks for applying KTE strategies, (2) barriers and facilitators to KTE, (3) methods and issues for measuring the impact of research studies and (4) perspectives from different stakeholder groups on what works and what does not work with respect to KTE" (p734). The implementation literature featured a range of approaches, as listed below.

Box 35. Strategies Identified in the Implementation Literature (Source: Mitton *et al*, 2007, p 744)

Key KTE Strategies Identified in the Literature

-
- Face-to-face exchange (consultation, regular meetings) between decision makers and researchers
 - Education sessions for decision makers
 - Networks and communities of practice
 - Facilitated meetings between decision makers and researchers
 - Interactive, multidisciplinary workshops
 - Capacity building within health services and health delivery organizations
 - Web-based information, electronic communications
 - Steering committees (to integrate views of local experts into design, conduct, and interpretation of research)
-

Lavis, Robertson *et al*'s (2003) paper is one of the organising frameworks for KTE that was analysed by Mitton *et al* (2007), along with Jacobson, Butterill and Goering (2003), Dobbins *et al* (2002), Hanney *et al* (2003) and Ebener *et al* (2006). Lavis, Robertson *et al* (2003) used five questions to provide an organising framework for a knowledge-transfer strategy:

- What should be transferred to decision makers (the message)?
- To whom should research knowledge be transferred (the target audience)?
- By whom should research knowledge be transferred (the messenger)?
- How should research knowledge be transferred (the knowledge-transfer processes and supporting communications infrastructure)?
- With what effect should research knowledge be transferred (evaluation)?

They distinguished between four audiences for applied health and economic/social research (p222): "general public/service recipients (e.g. citizens, patients, and clients), service providers (e.g. clinicians), managerial decision makers (e.g. managers in hospitals, community organizations, and private businesses), and policy decision makers at the federal, state/provincial, and local levels (Goldberg *et al*, 1994; Lomas 1990; Power and Eisenberg, 1998)". They went on to look at the literature to gain an understanding of how the five questions should be answered, and then asked research organisations for their own answer. The gap between the two indicated where there were opportunities for research organizations to improve their translation strategy. The opportunities include "developing actionable messages for decision makers, developing knowledge-uptake skills among target audiences and knowledge-transfer skills in research organisations, and evaluating the impact of knowledge-transfer activities" (p245).

Clarity of Terminology and Concepts

The lack of evidence for evidence-based knowledge transfer and exchange led Mitton *et al* to float the question “could it be that the concept of KTE in this context has been inappropriately transferred from clinical decision making?” (p757). They suggest that lack of evidence and lack of clarity undermines the concept of KTE. Tetroe *et al* (2008) came to the same conclusion.

Lee and Garvin (2003) criticise the term ‘knowledge transfer’ as a description of a one-way vector of information from physician to patient. They use critical theory (see Section 23) to argue for greater interaction and exchange between physician and patient (as opposed to practitioner and researcher).

Davies *et al* (2008) try to resolve discordant terminology by analysing the link between production of academic knowledge and its potential application in the practitioner community. ‘Knowledge transfer’ is rejected, even though it is the established shorthand. They contend that terms such as knowledge transfer and knowledge translation are too simplistic and fail to articulate “the complex and contested nature of applied social research”. ‘Knowledge interaction’ is preferred as a term to describe “the messy engagement of multiple players with diverse sources of knowledge”. ‘Knowledge intermediation’, the authors argue, “might begin to articulate some of the managed processes by which knowledge interaction can be promoted”. In attempting to mould the terminology, the applied social research community is trying to develop a vocabulary that is distinctive from the generic management sphere, and aiming to inject some conceptual clarity into an arena that is inevitably messy.

20. Organisational Learning (Phase 1 Health Literature)

The concept of 'learning' in the health literature is used explicitly in the forum of quality and patient safety. The emphasis is upon learning from clinical errors and avoiding repetition of mistakes, stimulated by high profile of examples such as child mortality rates at the Bristol Royal Infirmary (Kennedy, 2001, discussed in Currie *et al*, 2008).

20.1 Models of Learning

Carroll and Edmondson (2002) define organisational learning as a process of increasing the capacity for effective organisational action through knowledge and understanding (Fiol *et al*, 1985; Senge, 1990; Garvin, 2000). The learning process is conceptualised as a cycle of action and reflection, happening mainly at a local level. Organisations put in place structures and lines of communication to allow learning to flow through, for example, reviews, audits, simulation and benchmarking.

They critique the prevailing 'mental model' of organisational learning for health care, based on the dominant belief system that health care is "the application of a body of knowledge derived from medical science and perfected by a physician's own experience" (p52). It is individualistic and skills-based, exploiting specialist knowledge through experiential learning. Carroll and Edmondson suggest that a team-based approach is needed to create an open environment for learning. Local leadership is also needed to create purpose, build networks and accelerate organisational learning.

Nutley *et al* (2007) concur with Carroll and Edmundson's perspective, identifying five key disciplines of learning organisations: improving individual capabilities, team learning, updating mental models, a cohesive vision, open systems thinking (p166). The cultural values that facilitate organisational learning or celebration of success include: absence of complacency; belief in human potential; recognition of tacit knowledge; prioritising the immeasurable; openness, trust and being outward looking (p167).

Box 36. Theories of how individuals and organisations learn (Source: Rushmer & Davies, 2004, pii11)

Term	Brief description
Individuals ³¹	
Classical conditioning ³² (learning by association)	Learning that takes place when two events are experienced together in space and time and become associated with each other
Operant conditioning ^{33 34} (the carrot and the stick)	A learning process in which behaviours are followed by reinforcing or punishing consequences
Cognitive learning ³⁴⁻³⁶ (learning by understanding and thinking)	<ul style="list-style-type: none"> • Modelling: learning that occurs through the observation and imitation of the behaviours and experiences of others • Insight: learning through the "aha!" phenomena • Latent learning: where we soak up capacity, but this only becomes apparent when used at a later time
Learning curve ³⁷ (how we learn through time)	A line graph where performance is plotted against time during the learning process to study the process that learning new skills takes
Unlearning curve	Previously plotted as above mapping performance as it declines (or is established) variously speculated as a forgetting curve; an extinction curve; or a transfer of learning curve. We suggest that the unlearning process is not a simple, unitary, or unproblematic outcome of the learning process. We speculate that it is a distinct process, usually not spontaneous but appearing in various forms and a pivotal part of the management of professional practice where risk minimisation is critical.
Organisations ^{5 6}	
Single loop learning (the feedback loop)	Identification of problems in the present system, taking corrective action and returning performance to normal
Double loop learning (changing the system)	In the light of persistent problems taking steps to change the whole system to tackle the causes of problems
Triple loop learning (learning to learn)	Proactive attempts to identify what facilitates learning per se, and then to apply these generalised principles to help learning in other times and places

A summary of theories of learning in individuals and organisations (shown above) is presented by Rushmer and Davies (2004), who pick out 'unlearning' as a neglected area that requires further exploration. They distinguish between routine unlearning (and subsequent relearning) and 'deep unlearning' which requires "a substantive break with previous modes of understanding, doing, and being" (p110).

20.2 Empirical Cases

Organisational structures, such as networks and Academic Health Science Centres, are predicated on the assumption that learning and knowledge transfer will be improved. Two empirical examples of organisational learning are reported below.

20.2.1 Organisational Change and Learning

The Beacon Council Scheme is an example of a local government initiative which tried to foster learning by setting up organisations as exemplars of good practice. Rashman and Hartley (2002) found that the distinction between tacit and explicit forms of knowledge was a useful way of structuring the strengths and weaknesses of the scheme. Collaboration and inter-organisational networks were used to share tacit knowledge while explicit knowledge was sought by individuals who wanted data and performance statistics. They speculated that the scheme would be used by high-performing local authorities, who had the capacity for organisational change, and that barriers to learning existed among under-performing councils who would not ultimately benefit. The learning model underpinning the notion of Beacon Councils, they argued, was incomplete as it did not factor in barriers.

20.2.2 National Reporting and Learning System (NRSL)

Currie *et al* (2008) evaluated the introduction of the National Reporting and Learning System (NRSL) as a knowledge management system in the NHS. It is set in the context of a public sector agenda of transforming culture to become 'learning organisations', encouraging individuals, groups and organisations to share knowledge across boundaries.

High Reliability Organisations (HRO) such as aviation, nuclear energy and petrochemicals, combine risk with good safety records. They have been conceptualised by 'safety science', which distinguishes between activity performance errors and latent factors that create capacity for error. The framework has been influential in shaping the government's response to safety failure in the NHS through introduction of the critical incident reporting.

The findings of Currie *et al* highlight the problematic nature of knowledge and the fault lines of culture and power in hospitals. Doctors regained control of the system by choosing not to participate in incident reporting. Formal knowledge reported to managers was selective and limited compared to the informal knowledge located at service level. Doctors set up their own scheme, in keeping with the tradition of self-regulation and exclusivity, allowing them to protect and hoard knowledge. The findings are summarised below. The authors conclude that "policy in the patient safety domain inadequately extends managers' domain of influence over doctors" (p382) through the managerialist instrument of NRSL, while doctors continue to regulate clinical quality.

Table 17. Summary of findings on knowledge management (Source: Currie *et al*, 2008, p380)

Stage of reporting	Empirical example	Conceptual problem
I Identification and reporting of incident	a. Nurse and surgeon disagreed regarding safety risk of not sterilizing device	Cultural
	b. Clinical Director supported surgeon regarding above	Political
	c. Doctor completes report where he/she considers it a medical issue	Political
	d. Hospital guidelines vague	Knowledge
	e. Managers' and doctors' perspective upon patient safety diverges	Cultural
	f. Move from blaming individuals to systems thinking	Cultural
II Capturing incident through an information system	a. Standard reporting form not capture important information for clinical staff	Knowledge
	b. Standard reporting form not filled in accurately by clinical staff	Knowledge
	c. Clinical staff filled in form using overly technical language	Knowledge
	d. Managers not trust authenticity of information provided by clinical staff	Cultural
	e. Managers unite against clinicians when discussing incidents	Political
III Responses to analysis and feedback of incidents	a. Concern by doctors regarding managers' use of information	Political
	b. Doctors unwilling to fill in incident reports	Political
	c. Doctors unwilling to report on incidents involving their peers	Cultural
	d. Managers lack clinical knowledge to interpret and act upon incident report appropriately	Knowledge
	e. Doctors feel financial imperatives always 'win out' over quality	Political
IV Doctors re-assert control	a. Doctors moved blame for major incident from clinical to management domain	Political
	b. Doctors established own reporting systems	Knowledge
	c. Doctors informally shared learning amongst selves	Cultural

21. Organisational Form (Phase 1 Health Literature)

The health literature in our structured journal search (Phase 1) produced a limited level of interest in organisational form. At the beginning of the review period, clinical governance was a subject of interest (e.g. MColl & Roland, 2000; Halligan and Donaldson, 2001). In the middle of the period there was discussion about how much the NHS could learn from other models of care, with an implementation focus on managed care (Dixon *et al*, 2004).

Learning from Managed Care

Dixon *et al* (2004) found that competitive pressure between managed care organisations (MCOs) provided an incentive for innovation in management of chronic diseases, such as asthma, diabetes, chronic obstructive pulmonary disease and heart failure. Admission and day bed rates appeared to be lower in managed care organisations than in the NHS. They studied five selected MCOs in the US each serving a population of 100,000 or more: Kaiser Permanente (North California), Group Health (Washington State), Touchpoint Health Plan (Wisconsin), Anthem (Connecticut), and Health Partners (Minnesota).

The team found that, in the wider environment, market incentives drove efficiency. MCOs enrolled members for a fixed fee, and then co-ordinated provision of all services from primary to tertiary care. Competition between MCOs on the membership side (seeking contracts with large employers that purchase coverage for their employees) had more influence on change than competition on the hospital side where providers competed for contracts with the MCO.

On the organisational side, freedom to set priorities and development of good long term relationships with groups of physicians, clinical managers and clinical leaders all contributed to good performance and effective chronic disease management.

In the clinical domain, a generic chronic care model (Wagner, Austin *et al*, 2001) was widely used, with four organisations targeting high risk patients and providing intensive care management through nurse-outreach services. Clinical guidelines were used with low risk patients. Most organisations had invested heavily in case management and disease management systems. There was evidence of cost-effectiveness of better primary care in reducing preventable hospital admissions.

Case management, identifying high risk patients aged 65+ with multiple chronic conditions and intervening with intensive home-based care, offered clear advantages in preventing hospital admissions.

Networks, Organisational Learning and Knowledge Management

The theory of communities of practice was imported into discussions of organizational form through Bate and Robert's (2002) report on NHS Collaboratives. They were intended to "provide a 'new system of devolved responsibility' and 'help local clinicians and managers redesign local services around the needs and convenience of patients'" (Department of Health 2000a). The purpose of the paper was not to evaluate the initiative, which was in an early stage of development, but to explicitly import private sector theories on KM into the healthcare arena.

22. Communities of Practice (Phase 1 Health Literature)

In this scoping review of the health-related literature, Bate and Robert's (2002) paper is the first to explicitly introduce generic organisational theory into the health knowledge management debate. It marks a 'cross-over' point, adopting a micro perspective by focusing on communities of practice (CoP). Theoretical debate to this point had been couched at the macro level of whole systems and medical-management responses to the evidence base.

The distinction between academics and practitioners has recurred throughout this review, impinging on questions of knowledge translation and exchange (Mitton *et al*, 2007; Tetroe *et al*, 2008), which influences conceptions of knowledge and ways of knowing (e.g. Davies *et al*, 2008). We locate much of the discussion about the gap between academics and practitioners in the CoP domain.

22.1 The Academic-Practitioner Divide

The two worlds of academics and practitioners could, arguably, be regarded as epistemic communities (Brown and Duguid, 2001). There are research implications to using a CoP framework. Jaye and Egan (2006, pp3-4) note that the concept loses its analytical power if applied to communities that are too large or too small. Stickiness and leakiness of knowledge is theorized to operate along network and organisational boundaries (Brown and Duguid, 2001). One might speculate that barriers could be mediated by boundary objects to create a shared learning space (Swan *et al*, 2007) between the two communities.

22.1.1 Researchers and Policy

Black (2001) comments on the macro level of policy. He distinguishes the role and characteristics of 'politically naïve' researchers from those of policy makers, and recommends that a 'policy community' of civil servants and practitioners should inform the practice of the research community. He concedes that 'research evidence is more influential in central policy than local policy, where policymaking is marked by negotiation and uncertainty' (p277).

There is a conceptual distinction (Webb & Wistow, 1986) between "practice policies (use of resources by practitioners), service policies (resource allocation, pattern of services), and governance policies (organisational and financial structures)" (Black, 2001, p275). Black considers the link between evidence and practice policy, e.g. in use of drugs, to be accurately represented by the evidence-based model, constructed as a linear, rationalist and positivist relationship between evidence and policy. The model is judged to be weak in relation to service policies and negligible when it comes to governance policies.

Service policymakers need to meet a range of potentially conflicting goals, in which clinical effectiveness is just one objective alongside, for example, equity, industrial relations, and financial constraints promoting efficiency. Further barriers to service developments include contestability of evidence based on lack of consensus and competing sources such as personal experience. The role of civil servants as 'knowledge purveyors' is scrutinised and found wanting due to staff turnover, experience and workload pressures.

The evidence-based model is least effective at the interface between policy and research in the area of governance. Re-organisations, for example, do not use

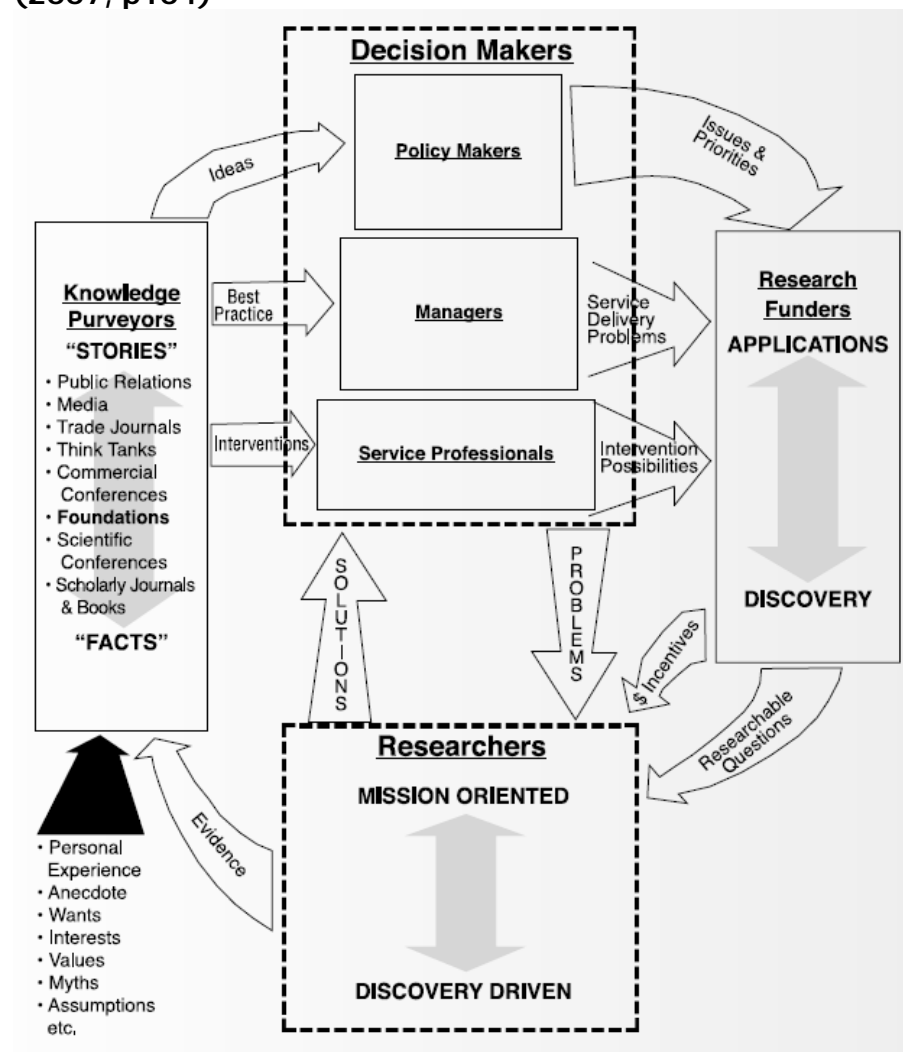
research evidence. Rather, “policies are driven by ideology, value judgments, financial stringency, economic theory, political expediency, and intellectual fashion” (Black, 2001, p276) (Davis & Howden-Chapman, 1996) rather than research evidence.

The enlightenment model of Weiss (1977), “in which knowledge is considered to be inherently contestable”, is a way of conceptualising greater dialogue and interaction between researchers and policymakers. Black draws on Lomas's (2000b) framework for understanding policymaking that takes into account institutional structure (its design, who is involved, rules of conduct), values (based on beliefs, ideologies, interests) and information (research, anecdote, experience, propaganda). He argues that, if researchers are to have any impact, they need to target values of policy makers, and worry less about strength of information.

22.1.3 Trajectory from Linear to Relational

Nutley, Walter and Davies (2007) highlight the developments in thinking and ideas from the early model of one-way linear relationships towards a relational perspective (as demonstrated in the linkage and exchange model in **Error! Not a valid bookmark self-reference.**).

Figure 51. Linkage and Exchange Model: CHSRF (2000), in Nutley *et al*, (2007, p104)



The 'two communities' thesis has been influential (Caplan, 1979; Wingens, 1999), emphasising that researchers and policy makers 'live in separate worlds, with different and often conflicting values, different rewards systems, and different languages' (Caplan, 1979, p459; quoted in Nutley *et al*, 2007, p99). The upshot is that policy makers do not use research. The two world metaphor, translated here into a communities of practice concept, has previously been described in terms of policy communities (Kingdon, 1984), advocacy coalitions (Sabatier, 1998) and epistemic communities (Haas, 1992), but not with the organisational precision applied by Brown and Duguid (2001) to epistemic networks of practice.

Tomson *et al* (2005) found that acceptance of research appeared to be the result of close interaction between researchers and policy-makers. Tetroe *et al* (2008) emphasise the interactive nature of successful research translation, where researchers and practitioners inform each other.

There are educational implications to the CoP theory, as Jaye and Egan (2006) used Wenger's (1998) theory of social learning to suggest that the notion of CoP has implications for curriculum planning.

22.1.4 Soft and Hard Knowledge

Russell, Greenhalgh *et al* (2004) (also discussed under IS/IT in section 17) compare explicit or codified knowledge with tacit knowledge, defined as context-specific "know-how". The formal, explicit knowledge, accessible through indexing services such as Medline, is more easily transferred between people and organisations than soft, informal knowledge "but may have little meaning for them and not be readily actionable". The authors proposed formation of 'soft networks' to bridge the gap between researcher and practitioner, based on an empirical evaluation.

23. Critical Theory

(Phase 1 Health Literature)

We saw in the management literature that health contexts are of interest to critical theorists or social scientists with a critical edge (e.g. Doolin, 2004; Currie and Kerrin, 2004; Currie *et al*, 2008; McNulty, 2002; Hanlon *et al*, 2005). Lee and Garvin (2003) also note that health contexts have increasingly been used as sites of interest for critical theorists (Lupton, 1998; Robertson, 1998; Bunton, Nettleton, & Burrows, 1995; Fox, 1994), in areas such as control over one's environment (Moss, 1997), empowerment (Anderson, 1996), and the influence of social capital on health (Hawe & Shiell, 2000; Lee, Ozanne, & Hill, 1999). Critical theoretical approaches question notions of 'truth', particularly from a feminist perspective (Barrett & Phillips, 1992; Haraway, 1991; Fraser & Nicholson, 1990), and the relationship between individuals and social forces (Williams & Calnan, 1996; Beck, Giddens, & Lash, 1994; Beck, 1992; Giddens, 1991).

In the health stream of the Phase 1 search, Goldenberg (2006) and Lambert (2006) have already been discussed in the context of 'what constitutes evidence?' (Chapter 15). Here we consider another three papers that are interested in the power dimension of critical discourse. Foucault is the theorist that dominates this domain.

Power and Knowledge

Ceci (2004) considered events in Winnipeg that were the subject of an inquest after 12 children died during or shortly after having cardiac surgery at the Winnipeg Health Sciences Centre, Manitoba, Canada, during 1994. It was apparent that the nurses involved had been worried about the surgeon's competence and had tried to air their concerns. She explored the reasons why "the nurses' concerns were not taken seriously" and why "knowledge practices, specifically those concerning who can claim status as a credible knower, produced limits for nurses". In other words, the nurses were inhibited from speaking out and "the limits produced by certain knowledge practices had the effect of rendering the nurses' concerns irrelevant". Ceci used Foucault's work as a lens of enquiry. The power of the medical voice which stunted the nursing voice was associated with the disaster of poor patient care.

Primary Care as Research Laboratory

Shaw and Greenhalgh (2008) undertook a critical exploration of primary care research and policy, considering its historical, social and political origins. They employed a Foucauldian approach to discourse analysis to identify the role of power and knowledge in the policy arena, trying to identify vested interests. The knowledge-based economy driven by "microscopic 'discovery', exploitation of information and the contribution of highly technological activities to 'UK plc'" was shown to be instrumental in shaping government policy. Primary care research, they observed, had come to the fore and been repositioned "as a strategic resource and 'population laboratory' for clinical research."

Knowledge Transfer and the Physician-Patient Dynamic

Lee and Garvin (2003) used critical theory to challenge the traditional linear model of knowledge transfer that assumes that changes in what clinicians know will translate into practice. They identified "three key problems inherent in health information transfer: (1) a focus on the individual, (2) the privileging of expert

over lay perspectives, and (3) the assumption that a one-way flow of information, from provider to recipient, is appropriate." (p449).

The individualist ethic was deemed to have two problems: 'blaming the victim' and conceptualising the body as a machine that needs to be fixed. The victim-blame problem is attributed to the public health tendency to link individual behaviour with health outcomes, e.g. smoking and diet, without taking account of structural factors that limit power and social freedom to change. The 'body as machine' concept, that requires science to mould the body to external ideals of perfect health, neglects the social constraints on health, behaviour and human agency (Haraway, 1991).

The one-way vector of information flow implicit in 'knowledge transfer' is exemplified by Lee and Garvin through Freire's (1970, 1986) 'banking concept' in which the student is the object or receptacle to be filled by the teacher who banks or deposits information.

The authors presented three case studies involving doctor-patient encounters, public health programming and national health policymaking in which one-way information transfer emerged as a key theme (even though it was not the primary focus of the enquiry). The case studies were qualitative and exploratory, with data collected mainly through focus groups and interviews.

The first study took place in a deprived Appalachian community in the US. It found that doctors blamed women for their poor health, devaluing their role, and believing that patients could act on information given to them. Both doctors and patients saw the clinical encounter as a one way monologue. The women resisted the construction and identified both individual and structural influences on health, citing experiences where they had tried to communicate their own knowledge to doctors.

"Like my mother-in-law, she don't have any insurance. I know that she is of the age where she needs yearly mammograms and stuff like that. She don't have them because she can't afford them. And she says if she did have them and something was wrong, she wouldn't have the money to take care of it, so she would rather not know if anything was wrong or not." Elaine

The second study included two public health projects relating to women and tanning in an urban centre in Ontario, Canada. The first project surveyed eleven key influencers, e.g. dermatologists and pharmacists. The second project interviewed 17 women, eliciting their life-stories after being shown pictures of a deeply tanned woman and a woman without a tan (Garvin & Wilson, 1999). The women were not passive receptacles. They either rejected the 'monologue of sun avoidance' completely, or found a compromise between expert advice and social expectations, modifying their behaviour on the basis of internal dialogue. The authors found an interconnection between the individualistic ethic, expert knowledge and resistance to one-way information flow.

The third study was an international analysis of policy development on skin-cancer in Australia, Canada and England (Garvin & Eyles, 2001) based on 15 in-depth interviews. It looked at the epistemic community (Haas, 1989) of scientists and the demarcation between science and policy. Health information relating to skin-cancer was again focused on individual behaviour. Scientists were clear that their role was to supply information "and that they should not be drawn into the messy world of politics" (p459). Health promotion specialists, for their part, were critical of expert advice and indicated that evidence should be

defined more broadly to include costs and benefits of socio-economic consequences of policy choices.

Lee and Garvin argued that their case studies showed a relationship between communication and power structures, but that users are aware of the power dynamic and resist playing the role of passive receptacles. In other words, the prevalent transfer model does not work. The concept of 'exchange' was introduced in a move to shift the pervasive and dominant model of power and control in health relationships, and to support the notion of public and patients being involved in producing, disseminating and using knowledge.

24. Anthropology, Culture & Conversation (Phase 1 Health Literature)

The domain of anthropology, culture and conversation management is small and their contents have largely been described elsewhere:

- An anthropological study has been considered in detail in the previous section on critical theory (Lee and Garvin, 2003).
- Gabbay and Le May (2004) conducted an ethnographic study of two general practices in England (discussed in Chapter 16) to find out how primary care clinicians (general practitioners and practice nurses) make their individual and collective decisions. They found that, contrary to the model of Evidence Based Medicine, clinicians did not use explicit evidence from research and other sources. Instead, they relied on “collectively reinforced, internalised, tacit guidelines”, described by Gabbay and Le May as “mindlines”.

25. Phase 2: Electronic Database Search

The Phase 1 structured search of journals has been reported in sections 15-24. A supplementary Phase 2 was conducted, based on a (limited) systematic search of four healthcare databases (reported in Section 3). The aim of this was three-fold:

- to capture relevant grey literature to inform and supplement the policy section 2;
- to capture practitioner literature by accessing journals that were not included in the structured journal search;
- to identify themes that may not have surfaced in the health and management Phase 1 search.

The Phases are not mutually exclusive. As we would expect, a number of titles feature in both searches, e.g. Mitton *et al* (2007), Nutley *et al* (2007). The methods, in terms of search string specification, are described in Section 3.

25.1 Volumes

Out of 548 titles/abstracts, 189 were deemed to be not relevant, usually because they were focused on narrowly scientific aspects of research. The distribution of domain themes, in ranked volume order, is set out below.

25.1.1 Domains

As in the Phase 1 health-literature search, evidence based health care is the largest single category. Barriers to knowledge, evidence and research utilisation ranks second. A new domain called 'super-structures' is identified.

Table 18. Volumes of Phase 2 Abstracts/Titles Mapped to Domains

Domain	clinical	non-clinical	Grand Total	% of 359
Evidence Based Movement	41	32	73	20%
Barriers, OD, Translation and Transformation	35	25	60	17%
Nature of Knowledge and Knowing	9	32	41	11%
IS/IT	13	26	39	11%
Organisational Learning	14	24	38	11%
Communities of Practice	12	20	32	9%
Performance and Knowledge Transfer	15	16	31	9%
Organisational Form	3	16	19	5%
Super structures	1	13	14	4%
Culture, anthropology	1	4	5	1%
Resource Based View	1	3	4	1%
Critical Theory	1	2	3	1%
Not Relevant		189	189	
Grand Total	146	402	548	
Relevant	146	213	359	100%

25.1.2 Practitioner/Management and Clinical/Non-Clinical

The table below shows that of the 359 titles/abstracts, 56% were related to

managers and 44% to clinicians, mainly described as 'nurse' or 'practitioner'. Out of the management papers, 33 were clinically-focused, leaving 167 (47%) of abstracts/titles described as non-clinical management.

Table 19. Focus of Abstracts/Titles

Clinical/Mgt	Medical	Nurse	Practitioner	Mgt	Grand Total	%
clinical	17	45	51	33	146	41%
non-clinical	2	28	16	167	213	59%
Grand Total	19	73	67	200	359	100%
%	5%	20%	19%	56%	100%	

The table below gives an example of titles in each of the boxes. Because the aim was to search healthcare databases, the non-clinical management papers still largely concern themselves with healthcare settings.

Table 20. Examples of Titles in Table Above

	Medical	Nurse	Other Practitioner	Management
clinical	Bernstein, J. (2004). "Evidence-based medicine." <i>Journal of the American Academy of Orthopaedic Surgeons</i> 12(2): 80-8.	Thompson, C., D. McCaughan, <i>et al.</i> (2005). "Barriers to evidence-based practice in primary care nursing - why viewing decision-making as context us helpful." <i>Journal of Advanced Nursing</i> 52(4): 432-444.	Robinson, K. L., M. S. Driedger, <i>et al.</i> (2006). "Understanding facilitators of and barriers to health promotion practice." <i>Health Promotion Practice</i> 7(4): 467-476.	Booth, A. (2001). "Managing knowledge for clinical excellence: ten building blocks." <i>Journal of Clinical Excellence</i> 3(4): 187-194..
Non-clinical	Knight, T. and A. Brice (2006). "Librarians, surgeons, and knowledge." <i>Surgical Clinics of North America</i> 86(1): 71-90.	Gifford, W., B. Davies, <i>et al.</i> (2007). "Managerial leadership for nurses' use of research evidence: an integrative review of the literature." <i>Worldviews on Evidence-Based Nursing</i> 4(3): 126-45	Greenhalgh, T. and J. Russell (2006). "Promoting the skills of knowledge translation in an online master of science course in primary health care." <i>Journal of Continuing Education in the Health Professions</i> 26(2): 100-8	Addicott, R., G. McGivern, <i>et al.</i> (2006). "Networks, organizational learning and knowledge management: NHS cancer networks." <i>Public Money and Management</i> April 2006

25.1.3 Limitations of Title/Abstract Information

Details of the publication were incomplete in nearly half of papers, including year of publication (46%) and journal title. It limited our ability to construct a time trend of themes.

25.2 Difference between Phases 1 & 2: Emphasis

There are two types of difference between Phases 1 and 2. The first is about emphasis and the second concerns new themes that have surfaced. This section considers the question of emphasis.

In Phase 2 there is: (a) greater clinical and practitioner emphasis; and (b) greater orientation towards empirical and implementation rather than theoretical studies.

25.2.1 Clinical and Practitioner Focus

Over half the papers deal with medical, nursing or other professional practitioner (occupational health, physiotherapy, speech and language therapy, primary care, public health, scientific, social care or social work) and clinical questions.

Medical practitioner literature falls into three types: emergency medicine (dominated by barriers to knowledge use); surgeons in orthopaedics and other specialties, (mainly evidence based practice); and doctors overall (organisational learning).

Nearly half of the practitioner literature has been written by nurses who, like the doctors, addressed the evidence based movement and barriers to knowledge and research use.

25.2.2 Empirical and Implementation Based

Phase 1 was based predominantly on high impact peer reviewed journals which, by their nature, are theoretically oriented. Empirical studies were invariably prefaced with a theoretical context and summary of the literature, with management papers typically running to 20+ pages. Phase 1 included some practitioner-focused journals, such as BMJ, which have high impact but rely on shorter articles with a reduced theoretical content. Phase 2 papers also contain a mix, but the orientation of practitioner articles is towards implementation rather than conceptually-based studies.

25.3 Difference Between Phases 1 & 2: Themes

The elements that distinguish the Phase 2 literature base from results of Phase 1 are that: (a) research utilisation is introduced; (b) we make a link with RBV; (c) we observe more recent developments in organisational form; (d) the 'super-structures' of healthcare emerge as a special organisational form.

25.3.1 Research Utilisation

The theme of 'research utilisation' comes to the fore, applying to 8% (28/359) of titles/abstracts. (The Phase 1 search identified 'knowledge' in the management literature and 'evidence' in the health literature as the object of interest. Evidence-based healthcare continues to be the most prominent domain.) 'Research utilisation' is a cross-cutting term which is especially prominent in discussions of barriers. The graph below shows that 40% of RU papers fall into the barriers/OD domain.

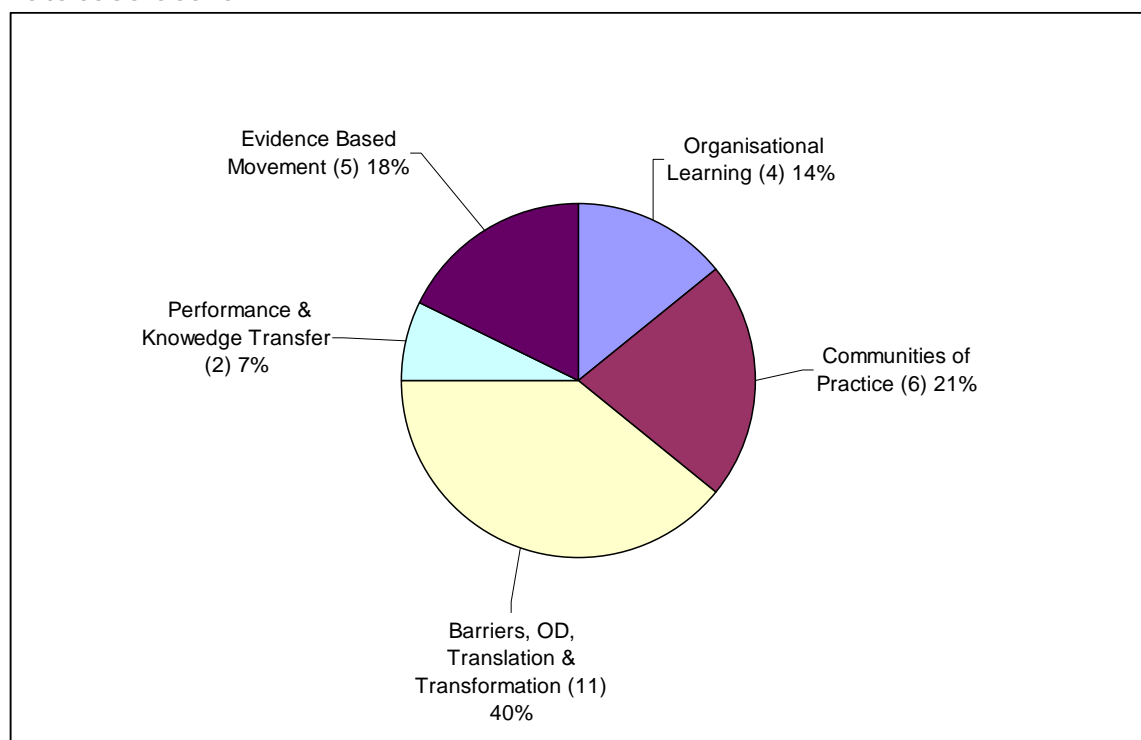
Nutley *et al* (2007) consider research in the context of three levels: (i) policy settings, (ii) organisation decision-makers and (iii) practitioners. They conclude

that the area of managers in organisations, i.e. at the 'meso' level, is under-explored. They indicate that the dominant research strategy in healthcare entails "push of information out from centre (clinical guidelines, National Service Frameworks), sometimes with considerable efforts at local adaptation;" with "some local initiatives to increase practitioner pull" (p6).

Nutley *et al* make a distinction between instrumental and conceptual uses of research, where instrumental use refers to a direct link between evidence and policy or practice decisions. Conceptual use is broader and more subliminal in its impact, affecting awareness and ways of thinking. It is likely to be the dominant route of research, confirmed by Innvaer *et al*'s (2002) study that found a 60:40 reported balance between conceptual:instrumental use.

There are parallels with the typology outlined by Allen *et al* (2007) describing three models of research utilisation or transfer: the engineering model, which is instrumental; the enlightenment model, which is conceptual (Weiss, 1979); the elective affinity model, which is interactive and suggests that a meeting of minds between researchers and decision makers will raise the likelihood of research being used (Short, 1997).

Figure 52. Research Utilisation Papers Mapped to Domains in Phase 2 Database Search



25.3.2 Resource-Based View

The Phase 1 structured journal search in the health sector did not produce anything in the RBV domain. The Phase 2 supplementary electronic database search yielded one journal title (out of 548) that mentioned 'resource-based view' in the abstract (Mark and Lynch, 2000). (The other 3 abstracts/titles coded to this domain did not mention RBV as a term but implied that knowledge added value). As the use of the term 'resource-based view', prominent in the management literature, is unique in our health search, and as the full paper could

not be obtained electronically, the abstract is presented below.

Box 37. Mark, A. and Lynch, R. (2000) What's new in strategic thinking? Recent developments and their implications for NHS strategy. Clinician in Management 9(2), 132-138.

Abstract: Five new trends in strategic thinking are identified: emergent strategy processes, the redefinition of strategic purpose, the resource-based view of strategy development, the concept of economic rent and the use of knowledge management and the Internet. These five areas are then explored in terms of their implications for the development of NHS strategy. It is argued that at the national level, NHS strategy should reconsider the role of the NHS in terms of its range of service provision. At the local level, NHS strategy should re-examine the specific purpose of a local health authority against those of other providers in the area. There is also a need to re-examine the individual strategic resources of a hospital or primary healthcare group.

25.3.3 Recent Developments in Organisational Form

The health literature in the Phase 1 search produced a limited level of interest in organisational form. Towards the end of the period (via Phase 2), empirical analysis based on a theoretical perspective has begun to emerge (e.g. Addicott *et al*, 2006).

Addicott *et al* (2006) considered the theory of learning across networked communities of practice in a study of managed clinical networks in the NHS, focusing on Cancer Networks. Clinicians reported that early informal networks had enabled interprofessional learning activities, whereas the formalised nature of the managed network was inclined to restrict knowledge-sharing activities. Efforts shifted to structural and financial issues. The authors note that “education activities and informal exchanges of knowledge were largely being superseded by a competitive agenda of structural configuration and meeting performance targets” (p90). They put up two possibilities: that networks have not delivered KM benefits because they have not been properly tried; or that they have been tried and have failed (p93).

A further possible interpretation of their evidence is that, given two potentially conflicting objectives – in this case organisational learning and organisational financial performance – the performance objective will prevail.

25.3.4 Super Structures as an Organisational Form

The policy chapter (Section 2) reveals a large infrastructure of health sector research and it is estimated that health-related R&D takes up 0.6% of GDP. This is large in the context of a Treasury target of R&D expenditure rising from 1.25% to 1.7% of GDP (HM Treasury *et al*, 2004) and an NHS budget that consumes 8%-9% of GDP in the UK (Source: OECD 2005). By infrastructure we mean the research funder or commissioner perspective, via publicly-funded or other bodies.

There is little in the Phase 1 search that appeared to deal with R&D infrastructure. Tetroe *et al* (2008) conducted an international study of health research funding agencies' support and promotion of knowledge translation. They conducted the study of thirty three agencies from Australia, Canada, France, the Netherlands, Scandinavia, the UK and the US, in the context that “little is known ... about health research funding agencies' support” in this area. (Findings in relation to knowledge translation are described in Section 19).

The wider Phase 2 search, however, located a small stream of literature (e.g. Hanney *et al*, 2003b; Nutley, 2003; Allen *et al*, 2007) that takes a step back and surveys R&D at the infrastructure, or at what we term the 'super structure' level.

Allen *et al*, (2007) introduce the problem faced by commissioners of research. Their concern is less about getting research into practice and more about "trying to commission research that meets the needs of the NHS in the first place" (p119). The Service Delivery and Organisation (SDO) R&D programme commissions research on behalf of the NHS. They describe Gibbons *et al*'s (1994) two modes of knowledge production: mode one is concerned with producing new knowledge, building on prior discipline-based knowledge; mode two is concerned with solving problems within society.

The two modes could be likened to the first and second gaps in translation highlighted by Cooksey (HM Treasury, 2006; see Section 2), where the first gap is from bench to product and the second gap is from product to practice. Mode one uses peer-reviewed journals for dissemination and mode two is for application by practitioners. (The Phase 1 search of this review could be described as Mode One while Phase 2 captures elements of Mode Two.)

Allen *et al* pose the SDO's challenge, being an applied research programme, as the need to strike a balance between Modes One and Two type of research. They describe processes of priority setting and dissemination, in the context of linkage and exchange models (e.g. Lomas, 2000b; CHSRF, 2000, in Figure 51). They conclude that interaction between decision makers and research commissioners "at the earliest possible stage" (p119) is key to successful knowledge transfer through research utilisation.

26. Conclusion

This study has looked at knowledge mobilisation and research utilisation in general management and health-related literature. It is unique in its scope because it has gone beyond healthcare applications of KM and RU to access the lessons from the wider literature. By comparing the two streams it has been possible to look at areas of convergence and identify where gaps arise.

26.1 Overview

The literature streams share a common interest in knowledge and the nature of knowing, but they use different vocabularies. Management deals with 'knowledge', health has been concerned with 'evidence' and practitioners highlight the use of 'research.'

Similarly, each stream can be characterised as having a different focus or pre-occupation. Practitioners are interested in barriers to utilisation of research. The health literature, certainly at the beginning of the review period, was concerned with stimulating a shift towards evidence-based management, moving the agenda on from its "clinical cousin" of evidence based medicine. The management literature, underpinned by economic theory, is very interested in performance and competitive advantage. This perspective is virtually absent from the health literature and has not been identified by previous reviews of healthcare KM – because it is not there. Both the health and management academic literatures share an epistemological trend from simple to complex ways of knowing.

Table 21. Overview of Vocabulary and Pre-Occupations by Literature Stream

	PRACTITIONER	HEALTH	MANAGEMENT
VOCABULARY	Research	Evidence	Knowledge
PREOCCUPATION	Barriers to Utilisation	Migration from EBM to EBMgt	Performance & competition
SHARED	Epistemological trend - from hierarchy & authority to contextual perspective		

The direction of knowledge movement is two-way. While we have observed influence from management theory into health, the health and social science sector is increasingly making an impact on the management literature. The tradition of critical discourse has not featured very much in management KM literature (Schulze and Stabell, 2004), and especially not in the IS/IT domain. Healthcare is prominent as a setting for critical theorists to explore questions of power, either between occupational groups, professions and management, or managers and workers through use of IS/IT (e.g. Hanlon *et al*, 2005, on NHS Direct). These papers are frequently published in management rather than health journals.

We have used exemplar papers in the management field to draw out the content of the review. Two were selected from each domain on the basis of (a) impact – where we selected papers with the highest citation count; and (b) interest – papers that were likely to have a lower citation count but be more up to date in general.

26.2 Comparing the Literature Streams

Volumes

The management literature is three times the size of the healthcare stream in the Phase 1 structured journal search. We accessed high impact peer-reviewed journals by searching 20 management and 9 health/social science journals over the period 2000-2008. These yielded 414 and 171 papers respectively, equivalent to 20.7 management and 19 health titles/abstracts per journal. We whittled the long list of titles/abstracts to a short list of 183 management and 68 health papers, equivalent to 9.7 papers per management journal and 7.6 papers per health journal. While the weighting is somewhat higher on the management side, the main reason for the higher volume of management papers is because of the initial selection strategy of the volume of journals. We supplemented the health stream by a Phase 2 search of electronic databases based on systematic criteria, generating 548 titles/abstracts which we reduced to 359 titles/abstracts. More than half the references were clinical and/or practitioner-focused.

Levels of Analysis - Micro, Meso, Macro

The management field operates at the micro and meso level, looking at individuals (e.g. Rodan and Galunic, 2004), groups as in communities of practice (e.g. Orlikowski, 2002), organisations/firms, and interrelationships and interactions that may occur in the form of networks, hierarchies or markets (e.g. Adler, 2001). In rare cases it considers super-structures or national institutions such as education and labour markets (e.g. Lam, 2000)

The health field tends to start from a macro perspective, considering medicine and management in the context of policy and demand and supply of R&D via national R&D programmes and funding. Different communities are identified, e.g. researchers and practitioners, doctors, professionals, managers. Further granulation tends towards local *versus* central (e.g. Black, 2001) and type of practitioner e.g. occupational therapy, public health. The organisational or 'meso' level receives little attention.

Vocabulary and Pre-Occupations

The difference in vocabulary and preoccupations has already been noted. The literatures start from different places. Management literature locates knowledge as part of the resource base of the firm which goes on to confer competitive advantage, since "knowledge is increasingly regarded as the critical resource of firms and economies" (Lam, 2000, p487). The word 'firm' and 'organisation' are synonymous, in keeping with economics literature. Health disciplines are rooted in scientific enquiry led by biomedical research, that enters organisational life through medical practice.

Cross-Over

The review has identified 'cross-over' authors who publish in both the literature streams, or have reported on health settings within the generic literature. They include Currie, Swan, Newell, Scarbrough, Dopson, Doolin, Hanlon. Cross-over perspectives have imported a critical edge into the generic literature through health case studies. In the other direction, authors have imported generic KM concepts into health, e.g. communities of practice (Bate and Robert, 2002); acquisition of tacit and experiential knowledge (Gabbay and Le May, 2004).

26.3 Thematic Domains, Discussion & Propositions

This section draws together some of the themes that emerged from the analysis of domains across both management and health literature. Gaps and directions for future research are highlighted in the form of propositions, capable of being confirmed or refuted by further work.

26.3.1 Nature of Knowledge and Knowing

The health and the management literature address questions of 'what is knowledge?' and 'how do we know what we know?' The line of enquiry has intensified in recent years.

Trend

We observe a trajectory of simple to complex, where earlier conceptions of knowledge as one-way directions of travel from knower to learner have been replaced by interactive models and then by models that emphasise context and perspective.

The trend is relevant on two counts. The first reflects Nonaka *et al's* (2006) assertion that 'epistemology matters', because strategies to share and generate knowledge vary accordingly. Spender (2008) developed a three-part typology of knowledge-as-data, knowledge-as-meaning, and knowledge-as-practice, reflecting different epistemologies that demand different responses to create and exploit knowledge. Knowledge-as-data in explicit, codified form lends itself to an IS/IT solution, whereas knowledge-as-meaning may require strategies for avoiding/ addressing critical incidents through sensemaking; knowledge-as-practice is interactive and embedded in individual and collective situations.

We observe in the health literature a timeline from 2000-2003 when the evidence-based agenda was uppermost, interjection of management theories (e.g. Bate and Robert, 2002; Gabbay and Le May, 2004), and from 2004-2008 a divergent approach to knowledge and knowledge, e.g. through interest in narrative (Greenhalgh *et al*, 2005). In the management literature we observe a growing recent focus on empirical work that tests theories of performance and the competitive advantage conferred by knowledge management. In some respects the pendulum is swinging from 'soft' back to 'hard'.

Developmental Model

The developmental model of individual learning (e.g. as presented by Knight and Mattick, 2006) provides a metaphor for organisational learning and knowledge acquisition. It can be reduced to a staged model starting from (i) the pre-reflective stage of certainty and belief based on tradition, to (ii) knowledge acquired from authority, to (iii) quasi-reflective stage of where knowledge accommodates different view points and depends upon interaction, to (iv) interpreted knowledge which can be applied to novel problems.

Nutley *et al* (2007, pp91-92) describe a similar trajectory in models of the research process from (i) early models of "rational, linear and one-way relationship between research and policy/practice" to (ii) use of multi-dimensional models, to (iii) relational, interactive to (iv) post-modern accounts "in which analyses of power are brought to the fore".

Discussion

We summarise discourses on knowledge into four stages that have parallels with staged models of development, attaching a metaphor to each: tepee representing acceptance of tradition; pyramid representing rational application of authority through hierarchy; web representing organic relational structures; prism representing interpretive perspectives that adopt a critical or reflective awareness of power. The matrix below is populated by some of the terminology mapped across from the literature.

Table 22. Proposed Developmental Model of Epistemology

	I	II	III	IV
LABEL	TRADITION	HIERARCHY	ORGANIC	PERSPECTIVE
GURU		WEBER	DUGUID	FOUCAULT
METAPHOR	TEPEE	PYRAMID	WEB	PRISM
	Folk	Linear	Network	Contingent
	Naïve	Codified	Communities of Practice	Context
	Common Sense	Expert	Tacit Knowledge	Interpretive
	Superstition	Authority	Collective	Reflective
		Objective	Social	Narrative
		Technical		Post-structural
		External	Internal	Post-modern
		Reification		Sense-making
		Sedimented		Socially-constructed
				Power/politics/culture
				Tolerance of ambiguity
				Methods: story telling, metaphors
ATTITUDE	Accepting	Rational	Relational	Critical/Reflective

The staged model above is put forward as a speculative response to the literature. We recognize that it carries a weight of value judgement, through progressions from data to wisdom (as in DIKW; Ackoff, 1989) which may be over-played. In drawing the distinction between explicit knowledge, conveyed by data and information, and tacit knowledge, implying knowledge and wisdom, academics tend to privilege tacit knowledge (Alavi and Leidner, 2001). Adler (2001), on the other hand, points out that explicit knowledge is cheaper to share and plays an important role in economic growth of organisations. The idea of becoming highly-evolved and reaching a state of wisdom – or reflective awareness – is attractive, redolent of Maslow's (1954) hierarchy of needs. However, we also observe a harder performance edge surfacing in the management literature which we anticipate will be reflected in health research. Further work is needed to explore the trajectory of knowledge and knowing in healthcare. The developmental model could provide a useful frame of reference.

PROPOSITION 1. Epistemology matters. For example, knowledge-as-data, knowledge-as-meaning, or knowledge-as-practice reflect different epistemologies that demand different responses to create and exploit knowledge.

Comment: Narrative enquiry and systematic enquiries, modelled on RCTs, are polarised in the literature. The role of patient experience lies at the heart of this debate. The medical hierarchy of evidence, placing systematic review of RCTs at the top and patient experience at the bottom, infuriates theorists (e.g. Goldenberg, 2006; Lambert, 2006) who argue that the patient experience is a legitimate form of evidence. Tranfield *et al's* (2003) arguments on the systematic nature of evidence appear uncompromising. Tensions are created by the duality

of *either* narrative *or* systematic evidence. Perhaps all epistemologies can be accommodated and exploited for different purposes. Further research is needed in the healthcare setting to consider competing epistemologies.

26.3.2 Evidence Based Health Care

The early part of the review period, from 2000 – 2003, in the health literature was dominated by discussions of evidence based health care. The model of evidence based medicine, with its hierarchy of evidence, was advanced by scholars such as Tranfield *et al* (2003) as the way forward for management. The EBM hierarchy of evidence counts systematic reviews and RCTs at the top and personal experience at the bottom of the hierarchy. Walshe and Rundall (2001) shifted the evidence-based research agenda from medicine to management. They recounted examples of over-use, under-use and misuse of research and proposed a list of reforms needed to effect a “paradigm shift of evidence-based health care” (p432).

At the same time, Black (2001) was urging caution among researchers about use of EBM’s linear model and recommending use of an interactive model of engagement between the distinct communities of researchers and policy makers. He also noted that research is more likely to be consumed centrally than at local level “where policymaking is marked by negotiations and uncertainty” (p277). Parallel developments in the KM field were rejecting linear models of explicit knowledge in favour of socially-constructed knowing in practice, as Gabbay and Le May pointed out (2004) in their empirical study of ‘mindlines’ constructed by primary care clinicians.

The question of what is management knowledge, as distinct from medical knowledge, is not fully addressed in the literature. Davies *et al* (2008) note “the unlikelihood of stable, acontextual knowledge”. The terminology of knowledge, evidence and research reveals the contextual and uncertain nature of the field:

- Knowledge Management - “knowledge is the individual ability to draw distinctions within a collective domain of action, based on an appreciation of context, or theory, or both” Tsoukas & Vladimirou (2001);
- Evidence Based (Informed, Aware) Practice - “There is a desperate need to identify fundamental conflicts about the nature of evidence” Davies, Nutley & Smith (2000, p.361);
- Research Utilisation - “research use [is] a complex, iterative and unpredictable process, which necessarily takes place within a political and politicised context” Nutley, Walter, Davies (2007, p269)

PROPOSITION 2: All management knowledge is contested. The multi-disciplinary discourses concerning knowledge, evidence and research will never converge

Comment. This report starts with three questions: “Why would an NHS manager be interested in using evidence or research? What constitutes management evidence or knowledge? Where there is evidence, research or knowledge that has been generated by the academic community, does it get into practice, and if not why not?” They have not been adequately addressed by the literature because there is no clear understanding of what we mean by management – as opposed to medical – evidence that is capable of being put into practice. There is scope for further research into this question.

26.3.3 Information Science and Information Technology

IS/IT as a discipline has been shown by Schulze and Leidner (2002) to be biased towards practicality and optimism about the value of knowledge management, with little in the way of critical discourse. Since the purpose of IS/IT is to produce solutions rather than problems, that is hardly surprising. The trends in the literature point to a move away from questions of 'what knowledge?' (e.g. Alavi and Leidner, 2001) to questions of 'what performance?' (Haas and Hansen, 2005; 2007). The suggestion is that different knowledge is required for different purposes, e.g. technical versus social-interactive solutions.

The health literature has focused on systematic reviews of clinical decision support systems (CDSS) which have found IS/IT to have been beneficial to patients in approximately two thirds of applications. At the same time, there is a growing awareness of the human-computer interaction aspects of IT design (e.g. Staggers *et al*, 2007).

PROPOSITION 3: IS/IT will become increasingly social and interactive in its capability within the work place.

Comment: There is little discussion of future IS/IT trends in the KM literature, although there are some allusions (Haas and Hansen, 2005; 2007). There is a mismatch between what we know are the capabilities of IS/IT through use in everyday transactions and how IS/IT is described in the health literature. There is a gap in the health literature on credible directions of change in IS/IT from the KM perspective.

26.3.4 Barriers to Transfer and Facilitators of OD

A model of flow barriers (Lin *et al*, 2008) allows us to analyse separately five components: context (power-culture and incentives); transfer (characteristics of knowledge and prescriptions for change); source (fear and perceptions); receiver (power, mistrust, burnout); organisational mechanisms and support.

The focus of papers in this domain is typically about barriers rather than enablers to knowledge sharing, and 'culture' is the dominant barrier (Hall and Goody, 2007). The majority of papers are empirical and, significantly, in the management literature half of the empirical papers use health settings to explore power imbalances and other barriers to uptake. Foucault (1977, 1980, 1982) provides a theoretical perspective on power (e.g. Doolin, 2004) and 'fear of exploitation,' 'fear of contamination,' 'mistrust' reflect some of the motivations that act as barriers.

Discussion. Mitton *et al*'s (2007) review of healthcare literature identified 'authority to implement changes' as an enabler to knowledge transfer. The management literature assumes that managers have authority because the lines of accountability in private industry may be determined by the organization. In the NHS there are multiple (and often non-negotiable) lines of accountability due to professional groupings and meso-macro interaction. We do not know the extent to which managers have autonomy. The exchange in the vignette in Box 1 suggests that managers' authority, like the nature of evidence, is contested.

PROPOSITION 4: Knowledge mobilisation is more than a technical activity. It is also cultural and political.

Comment: The management literature is more highly developed than health in this area. There are few empirical examples of culture, trust, mistrust and fear at

the organisational level that could inform KM strategies in health.

26.3.5 Knowledge Transfer and Performance

There are several interesting models of knowledge transfer that offer contrasting perspectives. Newell *et al* (2000) explain diffusion of complex technologies through incentives of suppliers who push complex ideas, 'blackboxing' them for consumption by receptive users who pull the technology into the organisation. The supplier perspective is consistent with the idea of fads and fashions, e.g. business process reengineering, (Abrahamson, 1991; 1996) that are hyped and then burn out because their rapid adoption is out of line with their inherent complexity. They are over-sold.

Parent *et al* (2007) build up a Dynamic Knowledge Transfer Capacity (DKTC) model based on social construction of reality (Berger and Luckmann, 1966). People interpret reality from the vantage point of their own context and experience and act on that basis, constructing a reality and generating knowledge out of their everyday interaction. "So as each of us interprets, uses and re-uses knowledge, we are also creating new knowledge" (p84). Learning new ways and unlearning old ways are part of the model. Parent *et al* make a distinction between generative capacity (innovation), disseminative capacity (built on social networks), absorptive capacity (organisational readiness), and second order adaptive-responsive capacity that seeks ways of changing in relation to the environment. They argue that these capacities within networks "represent a definite competitive advantage for network members" (p89).

Discussion. The thrust of this whole domain is to add value to the organisation through improved performance. The concepts involved in knowledge transfer include innovation, diffusion, transfer, translation, social exchange. NHS policy is currently looking towards innovation as a way of increasing quality without raising costs in a climate of financial constraint. "That is the issue for me: how do we get the best possible treatment to our patients and fastest and how do we make sure that we use innovation to improve and produce productivity gains," said David Nicholson, NHS Chief Executive (HSJ, 29th May 2000).

PROPOSITION 5: Productivity and efficiency will be increasingly important in a climate of spending restrictions, so knowledge transfer and diffusion of innovation will be essential to the health and performance of NHS organisations.

Comment: The review has outlined several models of knowledge transfer, two of which are reprised above. They emphasise the importance of understanding context and analyzing incentives of suppliers and consumers of knowledge. There is scope for developing this line of enquiry, especially as we enter a new period of constraint in public finances.

26.3.6 Organisational Learning

Organisational learning encompasses the meso level of knowledge acquisition, but it is not a unified field and the scoping review has drawn together literature that covers organisations, groups and individuals. Polarities help to bring the field into focus: cognitivism and constructivism see the brain as a computer on the one hand and as an epistemological inquiry into 'why do we cognize as we do' on the other (Spender, 2008); intentional learning is distinguished from experiential learning, through models of strategic learning (e.g. Thomas *et al*, 1997) and tacit learning (e.g. Williams, 2001); knowledge sharing may be either a social or a technical activity (Matsuo & Easterby-Smith, 2008), requiring group dynamics to

share tacit experience or IS/IT to mobilise explicit knowledge.

Several gaps and developments have been highlighted for further research. Spender (2008) suggests that organisations need to think beyond exploiting specialist knowledge into managing creation of knowledge. He noted that the future of organisational learning is to ground theory in “manager’s experiences and morally burdened practices as they apply their imagination to creating organizations” (Spender, 2008, p172). Easterby-Smith *et al* (2008) identified the role of boundaries as a promising area of future research, e.g. intra-organisational, inter-organisational, national, industrial cluster, highlighting the interstices between groups, organizations or macro structures. Rushmer and Davies (2004) found that unlearning, as distinct from learning, is a process that is under-explored in the literature. There has been little exploration of how organizational learning can be informed by the patient/user voice, found by Nicolini *et al* (2008) to be under-represented in the KM/RU field.

Organisational learning in the NHS is compromised by hoarding of knowledge, stimulated by three factors: (a) the problematic nature of knowledge, (b) existence of deeply embedded and long-standing occupational and organizational cultures within the NHS, especially those associated with professional groups, and (c) power imbalances, mainly due to dominance of doctors (Currie *et al*, 2008).

PROPOSITION 6: Organisational learning is not a unified field and the management literature offers a wide research agenda, e.g. in relation to organisational boundaries, specific groups of actors and unlearning.

26.3.7 Organisational Form

Strategic alliances, joint ventures (JV), networks, hierarchies, Professional Service Firms are all types of organisational form that are considered in relation to knowledge sharing. Relationships, reciprocity and issues of trust, as a requirement for creating and transferring knowledge at the boundaries of organisations, are attracting increasing interest in the literature, e.g. Adler (2001), Inkpen (2000), Becerra *et al* (2008), Kachra and White (2008). Lam (2000) draws a tight relationship between type of knowledge and organisational form, mapping: embrained knowledge to professional bureaucracies (applicable to doctors and hospitals); machine bureaucracy and encoded knowledge (applicable to the overall health system); operating adhocracy and embodied knowledge (applicable to management consultancies); J-form organisation and embedded knowledge, drawn from Japanese examples (applicable to team-based organisations).

The relationship between identity, organisational form and knowledge is brought out strongly for PSFs (Robertson and Swan, 2003; Alvesson, 2001). Elitism, image and rhetoric are used to manipulate the ambiguity of knowledge to create and sell a package in knowledge intensive firms including law, accountancy and consultancy.

There is very little work in the health literature on organisational form since the relationship between organisational form, knowledge sharing and performance has not been on the health research agenda up to now. This is research that would be useful to health service senior managers.

There is a persistent theoretical bias in favour of networks and partnerships, suggesting that collaborative forms are more effective than markets or hierarchies at sharing knowledge (e.g. Adler, 2001). Empirical studies (e.g. Bate and Robert, 2002) are more equivocal. Other agendas, such as

performance management and arguments about structural configuration, were found to dominate by Addicott *et al* (2006). They suggested that there were two possibilities: (a) networks had not been tried properly or (b) networks had been tried and failed.

Discussion. We speculate that conflicting objectives, e.g. OL and financial performance management, may compete with each other and, in 'bad times' the performance target dominates.

PROPOSITION 7: Boards will need to construct a meso perspective and take a view on organisational design. Partnership and network-based organisational forms are more effective at knowledge sharing than markets or hierarchies. There is payoff in collaborating.

26.3.8 Resource Based View of the Firm

RBV is an economics perspective that views the firm as the sum of its resources, among which knowledge is a key asset. RBV is implicit in the management literature, since all forms of knowledge or learning contribute to competitive performance. The VRIN conditions are core: resources and capabilities should be simultaneously valuable, rare, imperfectly imitable and non-substitutable (Easterby-Smith and Prieto, 2008, p236) to confer advantage.

Discussion

RBV does not feature in the health literature. Given the different market, incentive and value structure in health this may be entirely appropriate. However, we conjecture that just as there was a cross-over between general management and health from 2002 onwards with application of theorems of tacit knowledge and communities of practice, there is a role for the harder-edged and performance-oriented concept of RBV. The financial climate from 2010 onwards, combined with potential autonomy of Foundation Trusts, will lead health economies to seek productivity and performance advantages.

There does exist a body of empirical literature that examines the consequences of applying performance measurement to public services. Between 2001 and 2005, for example, a 'star rating' system was introduced to 'name and shame' NHS organisations, giving a zero star to failures and three stars to high performers that earned autonomy. It represented a 'targets-and-terror' system. (Bevan and Robinson, 2005). The relationship between research and specific public policy initiatives has not surfaced in this review because (a) it is not directly linked to KM/RU in organizations, and (b) these policies operate at the macro level. Dopson and Fitzgerald (2005), in their exploration of evidence-based health care, noted that research about organisations demonstrates "an overconnection to a research agenda set by the policy domain and a consequent failure to access and develop social science theory." Health care management research has been tied to a tradition of evaluating policy-based initiatives which, at the organisational level, (Ferlie, 2002) tends to be based on small-scale empirical enquiries using single case studies. There remain significant gaps in research at the meso level.

PROPOSITION 8: The NHS needs to consider how knowledge and information can be used to improve productivity, innovation and performance. The Resource Based View of the firm has application in health.

26.3.9 Critical Theory

Critical theory or critical perspectives stand in opposition to RBV and other

positivist theories that commodify knowledge and treat it as an asset that can be transferred easily. Currie *et al* (2008, p282) reject the application of private-sector models: "Inappropriately imported models of private sector management take little account of the distinctive properties of public sector organizations ... [N]aïve application of external, business sector and managerial policies ... are ill suited for the complexities and cultures of the NHS."

Critical discourse sees knowledge management as a contradiction in terms, since knowledge cannot be managed, only people. KM amounts to behavioural control (Alvesson and Kärreman, 2001). Schulze and Stabell (2004) point to the inherent contradiction in using tacit knowledge for competitive advantage, because the act of managing it destroys its qualities. Critical theory attracts attention in the generic literature because there is not enough of it (Schulze and Leidner, 2002).

The health sector appears well placed to fill the gap by using health settings to expose power and resistance between occupational groups, especially between doctors and managers (e.g. Doolin, 2004) and doctors and nurses (Ceci, 2004). The use of IS/IT as a means of controlling professionals (Hanlon *et al*, 2005) and as a technical fix that serves to harden existing practices and routines (Currie & Kerrin, 2004) is considered in health or healthcare-related industries.

Foucault (e.g. 1977) provides the main theoretical lens for analysing power and its application through surveillance and control, and a relational conception of power in which it is 'exercised from within the social body rather than above it' (Doolin, 2004, p345). (It is perhaps surprising that political scientists have not featured in this scoping review, although they are accessible via papers, e.g. Harrison, 2002 in Currie *et al*, 2007). The strategies that employees adopt to resist losing their own power include hoarding of knowledge (e.g. Currie *et al*, 2008; Empson, 2001). Language, as a tool of power and domination, is drawn out by Ceci (2004) in a study of high death rates among paediatric cardiology patients, where nurses' voices carried no authority. Lee and Garvin (2003) analysed the patient-doctor encounter and found a one-way vector from expert to user, where the user is expected to listen and absorb information with minimal exchange.

PROPOSITION 9: The health sector makes greater use of critical discourse than the management sector. The role of power among occupational groups in health systems makes it appropriate to temper all positivism with scepticism.

26.3.10 Communities of Practice

Communities of practice are among the "latest models to capture the imagination of the research and practice communities" (Parent *et al*, 2007, p83). They are motivated by shared goals and experiences and "cannot be mandated, but they can be encouraged, supported and promoted" (p83).

We have used the model to describe the two worlds of researchers and practitioners which, as they are not necessarily local and tightly-knit (Brown and Duguid, 1998; 2002), may be more accurately described as separate epistemic communities.

The gap between research and practice motivates this scoping study so it is an important theme which, in the generic KM literature, is peripheral rather than centre stage. Rynes *et al* (2001) consider the academics-to-academics discourse within research papers and press for greater interaction between researchers and practitioners. In the health academic literature, practitioners have tended to be

identified at the policy level, e.g. Nutley *et al*, (2007) and Black (2001). Wider practitioner literature considers both the macro policy and micro practitioner level. Uptake of research at the meso level receives little attention.

At the same time, there are live examples unfolding in the health sector. Chapter 2 contained a case study example of an Academic Health Science Centre in the UK. Vertical integration is using changes to organisational form ostensibly to link the communities of researchers and practitioners through translational activities from bench to bedside.

PROPOSITION 10: Organisational form is a mechanism for bridging gaps between communities of practice, e.g. through vertical integration or lateral formation of networks.

26.3.11 Anthropology, Culture and Conversation

This domain is not heavily populated in either the health or the management literature. There is a strong overlap with barriers to transfer since culture is commonly used to describe barriers to knowledge sharing (Hall and Moody, 2007).

Ethnographic methods of observation are an anthropological method, used by Carlile (2002) to describe activities in a design and production plant. He spent three to four days a week for nearly a year watching, listening to, talking with or questioning individuals and groups about their work. He observed how people found a common understanding of problems through the use of boundary objects, e.g. maps, drawings and databases, that provided a shared meaning. It provided a frame of reference for Swan *et al*'s (2007) study of boundary objects among biomedical researchers. Ethnography is expensive but has potential to offer insights that more conventional methods may miss. (Potential application of boundary objects and ethnographic methods include the interface between academics and practitioners, where research to date has focused largely on interaction and personal exchange.)

Gabbay and Le May (2004) used ethnographic methods to understand how primary care practitioner construct knowledge. The metaphor of 'mindlines' emerged, drawing from theoretical perspectives of tacit knowledge and learning in practice. The paper has been influential in undermining the model of evidence based healthcare among clinicians, with ramifications for knowledge mobilisation models among other groups such as managers.

The balance between empirical and non-empirical papers is similar in both Phase 1 literatures: 39% (72/183) empirical in the management literature and 37% (25/68) in health. In the management literature the prevailing method is qualitative interview and/or questionnaire to provide a quantitative dimension. In health care interviews, questionnaires and focus groups are common tools, with some exceptions, e.g:

- embedded multiple case study design to study how four expert groups formulated policy recommendations for breast, cervical, colorectal, and prostate cancer screening in Ontario, Canada, (Dobrow, Goel *et al*, 2006);
- tracking of email messages, interviews with core staff, and a qualitative analysis of messages, postings from focus groups & feedback to the service, (Russell & Greenhalgh *et al*, 2004)

PROPOSITION 11: We need more research at the distinctive meso level, using more sophisticated methodological designs

Comment. The main methodological gap in the health literature is any real focus on the meso level. Behaviour tends to be observed at the practitioner (micro) or policy (macro) level, with little focus on the organisation.

26.3.12 Super Structures

The policy chapter (Section 2) reveals a large infrastructure of health sector research and it is estimated that health-related R&D takes up 0.6% of GDP. This is large in the context of a Treasury target of R&D expenditure rising from 1.25% to 1.7% of GDP (HM Treasury *et al*, 2004) and an NHS budget that consumes 8%-9% of GDP in the UK (Source: OECD 2005).

We located a small stream of literature concerned with R&D infrastructure, which we call the 'super structure' level. Allen *et al*, (2007) introduce the problem faced by commissioners of research in "trying to commission research that meets the needs of the NHS in the first place" (p119). They conclude that interaction between decision makers and research commissioners "at the earliest possible stage" (p119) is key to successful knowledge transfer through research utilization.

Discussion: The focus of enquiry in the literature has been about getting research into practice, effectively located in the second gap in translation (Cooksey, HM Treasury, 2006). The relationship between policy makers and researchers has been explored, usually with a view to skilling-up researchers (e.g. Black, 2001). Infrastructure issues did not surface at all in Phase 1, only Phase 2 of this scoping review. The implication is that insufficient attention is being paid to the structure (or *deus ex machina*) that funds research priorities.

PROPOSITION 12: There is insufficient research into the structures which fund R&D.

26.4 Final Observations

26.4.1 Limitations of this Review

The study is meant to be a scoping review and as such is not expected to be exhaustive in every domain. However, we have applied checks and balances (in the form of the Phase 2 search) to ensure a comprehensive survey of the field. Propositions are used as a device to highlight potential lines of enquiry and gaps in the literature. Potential limitations or weaknesses are considered below:

- domain analysis – use of an inductive approach to classifying domains has advantages in not being tied to a predefined framework. We have not attempted to fit square pegs into round holes by shoe-horning enquiries into theoretical frameworks regardless of fit (as described by Rynes *et al*, 2001). However, there is a degree of arbitrariness in assigning papers to domains that risks being confusing to the reader. (Appendix 1, listing papers by domain, is included to mitigate this);
- reporting - the repetition of cross-cutting themes occurring between domains trades clarity for the sake of content, e.g. power appears in critical discourse, and as a barrier to transfer. We have not applied a reductive approach to the structure, but retained the domain taxonomy;

- the Phase 1 literature is dominant and the Phase 2 literature is supplementary to the review. The strength or value added in focusing on management literature and KM risks giving too little weight to research utilisation in the health sector. There is, however, an authoritative and comprehensive recent synthesis available (Nutley *et al*, 2007) which is extensively referenced in the review.

26.4.2 Concluding Remarks & Recommendations

We have reviewed the literature on knowledge mobilisation and research utilisation, looking for evidence of work on the meso level. The scope of the review is to look at research in the area, effectively researching the research that has been undertaken on use of research. That is a long way from the practitioner community. We have not talked to a practitioner (as it was not within the remit of the project) and empirical work is clearly to be recommended.

This scoping review has paid particular attention to the management literature to look at what it can offer. Healthcare has imported generic management theorems in the past to good effect, drawing on theories of tacit knowledge and sensemaking to construct models that competed with the prevailing orthodoxy of evidence based healthcare. The health sector has a well developed sense of power structures that informs the discourse in generic literature. It is also aware of the macro environment in which institutions work. We have identified a gap between management and health in the form of RBV, the economic perspective of an organisation in the context of competition and advantage. We conjecture that there is scope to develop this perspective in the health arena, but are mindful of the need to temper private sector models with health sector realities. The role of doctors as the dominant occupational group is not trivial and needs to be factored into healthcare theoretical frameworks.

The review has explored a divergent literature speaking different languages. There is no unified theory or discipline to cover the field. This study has drawn links between disciplines, compared health and management streams of thought, and identified gaps and opportunities for further research. We recommend that the twelve propositions set out in this scoping review are used to inform further action and research

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Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - ORGANISATIONAL FORM	Citations	Empirical	Level/Focus of Analysis	Methods
Inkpen, Andrew, C.(2000). "Learning Through Joint Ventures: A Framework Of Knowledge Acquisition." Journal of Management Studies 37(7): 1019-1044.	55	No	Joint Venture firm and alliances	Develops propositions based on literature and conceptual framework
Birkinshaw, J., R. Nobel, et al. (2002). "Knowledge as a Contingency Variable: Do the Characteristics of Knowledge Predict Organization Structure?" ORGANIZATION SCIENCE 13(3): 274-289.	42	Yes	embeddedness. And their influence over the level of unit autonomy and interunit integration in an international network of R&D units.	Questionnaire 100 managers in 15 Swedish multinational firms. Statistical analysis of responses
Hardy Cynthia. (2003). "Resources, Knowledge and Influence: The Organizational Effects of Interorganizational Collaboration*." Journal of Management Studies 40(2): 321-347.	32	Yes	NGO in Palestine: nutritional services to women and children	Qualitative case study: multiple instances of collaboration
Robertson Maxine, Jacky Swan, (2003). "'Control - What Control?' Culture and Ambiguity Within a Knowledge Intensive Firm*." Journal of Management Studies 40(4): 831-858.	24	yes	Professional Service Firm	2 year case study
Young Gary J. (2001). "Top manager and network effects on the adoption of innovative management practices: a study of TQM in a public hospital system." Strategic Management Journal 22(10): 935-951.	21	Yes	Top Managers and Network characteristics within Veteran's Health Administration	Statistical model
Lowendahl, B., O. Revang, et al. (2001). "Knowledge and value creation in professional service firms: A framework for analysis." Human Relations 54(7): 911-931.	20	No	Professional Service Firm	Conceptual framework based on literature
Brown, J. S. and P. Duguid (2002). "Local Knowledge: Innovation in the Networked Age." Management Learning 33(4): 427-437.	17	No	Silicon Valley	Framework of analysis based on Silicon Valley
Nonaka, I., G. von Krogh, et al. (2006). "Organizational Knowledge Creation Theory: Evolutionary Paths and Future Advances." Organization Studies 27(8): 1179-1208.	16	No	East meets West - contrasting organisational forms linked to types of knowledge	Literature review based on theoretical perspective
Robertson, M., H. Scarbrough, et al. (2003). "Knowledge Creation in Professional Service Firms: Institutional Effects." Organization Studies 24(6): 831-857.	13	Yes	Professional Service Firm	Describes case studies
Bresnen, M., A. Goussevskaia, et al. (2004). "Embedding New Management Knowledge in Project-Based Organizations." Organization Studies 25(9): 1535-1555.	13	Yes	Project Based Firm	Case study of change within UK construction industry
Werr, A. and T. Stjernberg (2003). "Exploring Management Consulting Firms as Knowledge Systems." Organization Studies 24(6): 881-908.	12	Yes	Professional Service Firm	Interviews in 6 case study firms
Adler, P.S. (2001) "Market, Hierarchy, and Trust: The Knowledge Economy and the Future of Capitalism." ORGANIZATION SCIENCE 12(2): 215-234.	9	No	Firm	Speculative - analytical framework
Verona, G., E. Prandelli, et al. (2006). "Innovation and Virtual Environments: Towards Virtual Knowledge Brokers." Organization Studies 27(6): 765-788.	7	No	Knowledge Broker	Conceptual framework based on literature
Bevern, J. V. (2003). "Does health care for knowledge management? " Journal of Knowledge Management 7(1): 90-95.	2	Yes	Managers in Australian Regional Health Care Organisation	Discussion groups which generated reports
Willem, A., M. Buelens, et al. (2006). "The role of inter-unit coordination mechanisms in knowledge sharing: a case study of a British MNC." Journal of Information Science 32(6): 539-561.	2	Yes	British Multi National Corporations	Questionnaire and interviews
Dyer, Jeffrey H. K. N. (2000). "Creating and managing a high-performance knowledge-sharing network: the Toyota case." Strategic Management Journal 21(3): 345-367.	1	Yes	Toyota	Interviews
Ariff Kachra, R. E. W. (2008). "Know-how transfer: the role of social, economic/competitive, and firm boundary factors." Strategic Management Journal 29(4): 425-445.	1	Yes	R&D scientists	Policy-capturing method: quantitative

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - IS/IT	Total	Empirical	Level/Focus of Analysis	Methods
Alavi, M. and D. E. Leidner (2001). "Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues." MIS Quarterly 25(1): 107-136.	495	No		
Schultze, U. and D. E. Leidner (2002). "Studying Knowledge Management in Information Systems Research: Discourses and Theoretical Assumptions." MIS Quarterly 26(3): 213-242.	63	No		
Hansen, M. T. and M. R. Haas (2001). "Competing for Attention in Knowledge Markets: Electronic Document Dissemination in a Management Consulting Company." Administrative Science Quarterly 46(1): 1-28.	38	yes	management consultancy company	interviews and measures of document demand
Atreyi Kankanhalli, B. C. Y. T. K.-K. W. (2005). "Understanding seeking from electronic knowledge repositories: An empirical study." Journal of the American Society for Information Science and Technology 56(11): 1156-1166.	6	yes		survey instrument - written questions
Stok W, K. C. (2005). "Evaluating the role and effectiveness of an intranet in facilitating knowledge management: a case study at Surrey County Council " Information and Management 42(5): 731-744.	0	yes	surrey county council employees	phenomenological and interviews
Chalmeta, Ricardo, R. G. (2008). "Methodology for the implementation of knowledge management systems." Journal of the American Society for Information Science and Technology 59(5): 742-755.	0	yes - testing the methodology	application of methodology in large textile enterprise	

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - ORGANISATIONAL LEARNING	Citation	Empirical	Level/Focus of Analysis	Methods
Lam, A. (2000). "Tacit Knowledge, Organizational Learning and Societal Institutions: An Integrated Framework." <i>Organization Studies</i> 21(3): 487-513.	94	no		
Rynes, S. L., J. M. Bartunek, et al. (2001). "Across the Great Divide: Knowledge Creation and Transfer between Practitioners and Academics." <i>The Academy of Management Journal</i> 44(2): 340-355.	92	meta	practitioners and academics	meta-analysis
Thomas, J. B., S. W. Sussman, et al. (2001). "Understanding "Strategic Learning": Linking Organizational Learning, Knowledge Management, and Sensemaking." <i>ORGANIZATION SCIENCE</i> 12(3): 331-345.	33	yes	Centre for Army Lessons Learned	case study leading to conceptual framework
Mohrman, S. A., C. B. Gibson, et al. (2001). "Doing Research That Is Useful to Practice: A Model and Empirical Exploration." <i>The Academy of Management Journal</i> 44(2): 357-375.	33	yes		retrospective - applies framework to previous research project - derives measures
Boland Richard, J. Jr., J. Singh, et al. (2001). "Knowledge Representations and Knowledge Transfer." <i>The Academy of Management Journal</i> 44(2): 393-417.	30	yes	managers	laboratory experiments
Andrews, Kate M. B. L. D. (2000). "Influences On Knowledge processes In Organizational Learning: The Psychosocial Filter." <i>Journal of Management Studies</i> 37(6): 797-810.	27	yes	individuals in Biomedical Consortium	interviews
Chiva, R. and J. Alegre (2005). "Organizational Learning and Organizational Knowledge: Towards the Integration of Two Approaches." <i>Management Learning</i> 36(1): 49-68.	12	no		
Inkpen, Andrew C. W. P. (2006). "An Examination of Collaboration and Knowledge Transfer: China–Singapore Suzhou Industrial Park." <i>Journal of Management Studies</i> 43(4): 779-811.	10	yes	Singapore and Chinese Government	interviews
Lin, H.-F. (2007). "Effects of extrinsic and intrinsic motivation on employee knowledge sharing intentions." <i>Journal of Information Science</i> 33(2): 135-149.	8	yes	141 executives in large Taiwanese companies	questionnaire
Strati, A. (2007). "Sensible Knowledge and Practice-based Learning." <i>Management Learning</i> 38(1): 61-77.	5	yes		used previous field work
Easterby-Smith, Mark. (2008). "Inter-Organizational Knowledge Transfer: Current Themes and Future Prospects." <i>Journal of Management Studies</i> 45(4): 677-690.	2	no		
Gourlay Stephen, (2004). "On Organizational Learning and Knowledge Management." <i>British Journal of Management</i> 15(S1): S96-S99.	1			
Tsang, E. W. K. (2008). "Transferring Knowledge to Acquisition Joint Ventures: An Organizational Unlearning Perspective." <i>Management Learning</i> 39(1): 5-20.	1	yes	8 Chinese JV	37 managers interviewed
Orzano, A. John. (2008). "A knowledge management model: Implications for enhancing quality in health care." <i>Journal of the American Society for Information Science and Technology</i> 59(3): 489-505.	1	not really	primary care practice	hypothetical scenario - model rooted in literature
Allan, P. O. Williams (2001). "A Belief-focused Process Model of Organizational Learning*." <i>Journal of Management Studies</i> 38(1): 67-85.	0	no		
Gerardo, P. (2003). "Sensemaking on the Shop Floor: Narratives of Knowledge in Organizations*." <i>Journal of Management Studies</i> 40(2): 349-375.	0	yes	shop floor workers	phenomenological
Ringberg, Torsten, M. R. (2008). "Towards a Socio-Cognitive Approach to Knowledge Transfer." <i>Journal of Management Studies</i> 45(5): 912-935.	0	no		
Spender, J. C. (2008). "Organizational Learning and Knowledge Management: Whence and Whither?" <i>Management Learning</i> 39(2): 159-176.	0	no		
Schulz, K.-P. (2008). "Shared Knowledge and Understandings in Organizations: Its Development and Impact in Organizational Learning Processes." <i>Management Learning</i> 39(4): 457-473.	0	yes	pharmaceutical company	interviews and participatory observation
Marshall, N. (2008). "Cognitive and Practice-based Theories of Organizational Knowledge and Learning: Incompatible or Complementary?" <i>Management Learning</i> 39(4): 413-435.	0	yes		case study: ethnographic observation and cognitive mapping
Easterby-Smith, Mark, (2008). "Dynamic Capabilities and Knowledge Management: an Integrative Role for Learning?" <i>British Journal of Management</i> 19(3): 235-249.	0	no		
Makoto Matsuo, M. Easterby-Smith. (2008). "Beyond the knowledge sharing dilemma: the role of customisation." <i>Journal of Knowledge Management</i> 12(4): 30-43.	0	yes	Japanese IT specialists	interviews

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - CRITICAL THEORY	Total	Empirical	Level/Focus of Analysis	Methods
Alvesson, Mats D. K. (2001). "Odd Couple: Making Sense of the Curious Concept of Knowledge Management." <i>Journal of Management Studies</i> 38(7): 995-1018.	51	no		
Empson, L. (2001). "Introduction: Knowledge Management in Professional Service Firms." <i>Human Relations</i> 54(7): 811-817.	18	no	professional service firm	
Schultze Ulrike, C. S. (2004). "Knowing What You Don't Know? Discourses and Contradictions in Knowledge Management Research*." <i>Journal of Management Studies</i> 41(4): 549-573.	12	no		
Currie, G. and M. Kerrin (2004). "The Limits of a Technological Fix to Knowledge Management: Epistemological, Political and Cultural Issues in the Case of Intranet Implementation." <i>Management Learning</i> 35(1): 9-29.	11	yes	pharmaceutical company	case study - interviews
Hanlon, G., T. Strangleman, et al. (2005). "Knowledge, technology and nursing: The case of NHS Direct." <i>Human Relations</i> 58(2): 147-171.	10	yes	Nursing direct	qualitative
Sheffield, J. (2008). "Inquiry in health knowledge management." <i>Journal of Knowledge Management</i> 12(4): 160-172.	0	no		
Ekbja, H. R. and N. Hara (2008). "The quality of evidence in knowledge management research: practitioner versus scholarly literature." <i>Journal of Information Science</i> 34(1): 110-126.	0	no		

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - RESOURCE BASED VIEW OF THE FIRM	Citations	Empirical	Level/Focus of Analysis	Methods
McEvily Susan K. B. C. (2002). "The persistence of knowledge-based advantage: an empirical test for product performance and technological knowledge." <i>Strategic Management Journal</i> 23(4): 285-305.	69	Yes	Adhesives industry	Survey instruments: ranking performance criteria by managers
Ambrosini, Véronique C. B. (2001). "Tacit Knowledge: Some Suggestions for Operationalization." <i>Journal of Management Studies</i> 38(6): 811-829.	37	Not quite	Proposes a methodology aimed at managers	uses causal mapping, self-Q and storytelling; drawn from cognitive (psychology) and ethnographic methods
Sher PJ, L. V. (2004). "Information technology as a facilitator for enhancing dynamic capabilities through knowledge management " <i>Information and Management</i> 41(8): 933-945.	26	yes	survey of major Taiwanese companies	questionnaire survey and regression analysis of results
Newell, Sue H. Scarbrough. J. Swan. (2001). "From Global Knowledge Management to Internal Electronic Fences: Contradictory Outcomes of Intranet Development." <i>British Journal of Management</i> 12(2): 97-111.	24		"Eurobank" - European single financial-services company; 3 IT case studies	10 interview accounts - repeated across 3 - 4 field visits over 2.5 years
Widen-Wulff, G. and M. Ginman (2004). "Explaining knowledge sharing in organizations through the dimensions of social capital." <i>Journal of Information Science</i> 30(5): 448-458.	21	No	Conceptual framework and proposed measures	
Lenox Michael, A. K. (2004). "Prospects for developing absorptive capacity through internal information provision." <i>Strategic Management Journal</i> 25(4): 331-345.	20	yes	pollution prevention practices in information & communications industry	Quantitative
Wilcox King Adelaide, C. P. Z. (2003). "Measuring organizational knowledge: a conceptual and methodological framework." <i>Strategic Management Journal</i> 24(8): 763-772.	18	yes	17 firms in hospital and textile industries	interviews with managers
Levett, Gavin P. M. D. G. (2000). "A methodology for knowledge management implementation" <i>Journal of Knowledge Management</i> 4(3): 258-270.	6	yes	automotive industry	case study - quantitative analysis
Yang, C. and L.-C. Chen (2007). "Can organizational knowledge capabilities affect knowledge sharing behavior?" <i>Journal of Information Science</i> 33(1): 95-109.	5	yes		278 questionnaires from different industries
Donaldson, L. (2001). "Reflections on knowledge and knowledge-intensive firms." <i>Human Relations</i> 54(7): 955-963.	4	no		
Mesquita, Luiz F. (2008). "Comparing the resource-based and relational views: knowledge transfer and spillover in vertical alliances." <i>Strategic Management Journal</i> 29(9): 913-941.	1	yes	suppliers to equipment industry	questionnaire
Connell Julia, R. V. (2007). "Strategic alliances and knowledge sharing: synergies or silos?" <i>Journal of Knowledge Management</i> 11(3): 52-66.	0	yes		survey

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - NATURE OF KNOWLEDGE AND KNOWING	Citations	Empirical	Level/Focus of Analysis & Methods
Haridimos Tsoukas, E. V. (2001). "What is Organizational Knowledge?" Journal of Management Studies 38(7): 973-993.	97	yes	customer care department in Greek mobile phone co; case study : interviews and observation
Tranfield David, D. D. P. S. (2003). "Towards a Methodology for Developing Evidence-Informed Management Knowledge by Means of Systematic Review." British Journal of Management 14(3): 207-222.	40	no	uses a lot of health references because draws from evidence based medicine foundation
Alvesson, M. (2001). "Knowledge work: Ambiguity, image and identity." Human Relations 54(7): 863-886.	36	no	knowledge intensive firms; review of literature
Hargadon, A. and A. Fanelli (2002). "Action and Possibility: Reconciling Dual Perspectives of Knowledge in Organizations." ORGANIZATION SCIENCE 13(3): 290-302.	32	yes	2 case study firms: innovation processes
Becker Markus, C. (2001). "Managing Dispersed Knowledge: Organizational Problems, Managerial Strategies, and Their Effectiveness." Journal of Management Studies 38(7): 1037-1051.	22	no	
Holsapple C.W. K. D. J. (2004). "A formal knowledge management ontology: Conduct, activities, resources, and influences." Journal of the American Society for Information Science and Technology 55(7): 593-612.	18	yes	30 KM practitioners and researchers; Delphi
Grandori, A. and B. Kogut (2002). "Dialogue on Organization and Knowledge." ORGANIZATION SCIENCE 13(3): 224-231.	16	no	
Luen, T. W. and S. Al-Hawamdeh (2001). "Knowledge management in the public sector: principles and practices in police work." Journal of Information Science 27(5): 311-318.	15	yes	uses police as case study for analysis; no description of methods
Cornelissen, Joep, P.(2006). "Metaphor and the Dynamics of Knowledge in Organization Theory: A Case Study of the Organizational Identity Metaphor." Journal of Management Studies 43(4): 683-709.	12	meta	literature review, searching on 'metaphor'
Haridimos Tsoukas, N. M. (2004). "Introduction: Knowledge Construction and Creation in Organizations." British Journal of Management 15(S1): S1-S8.	11	no	
Herschel, Richard T. H. N., David Steiger (2001). "Tacit to explicit knowledge conversion: knowledge exchange protocols" Journal of Knowledge Management 5(1): 107-116.	9	yes	protocols between doctors and patients
Chia, R. (2003). "From Knowledge-Creation to the Perfecting of Action: Tao, Basho and Pure Experience as the Ultimate Ground of Knowing." Human Relations 56(8): 953-981.	9	no	
Lehr Jennifer K. R. E. R. (2002). "Organizational measures as a form of knowledge management: A multitheoretic, communication-based exploration." Journal of the American Society for Information Science and Technology 53(12): 1060-1073.	7	no	
Gourlay, Stephen, (2006). "Conceptualizing Knowledge Creation: A Critique of Nonaka's Theory." Journal of Management Studies 43(7): 1415-1436.	7	no	
Jashapara, A. (2005). "The emerging discourse of knowledge management: a new dawn for information science research?" Journal of Information Science 31(2): 136-148.	4	no	
Collins, H. (2007). "Bicycling on the Moon: Collective Tacit Knowledge and Somatic-limit Tacit Knowledge." Organization Studies 28(2): 257-262.	3	no	
Whitley, R. (2008). "Varieties of Knowledge and Their Use in Business and Management Studies: Conditions and Institutions." Organization Studies 29(4): 581-609.	2	no	
Chalee Vorakulpipat, Y. R. (2008). "An evolutionary and interpretive perspective to knowledge management " Journal of Knowledge Management 12(3): 17-34.	1	no	
Thompson Mark P. A. G. W. (2004). "Placing Knowledge Management in Context." Journal of Management Studies 41(5): 725-747.	0	no	
Everman Joerg. (2005). "Towards a cognitive foundation for knowledge representation." Information Systems Journal 15(2): 147-178.	0	no	
Roberts, Joanne, (2007). "Knowledge in the Organization of Contemporary Business and Economy." Journal of Management Studies 44(4): 656-668.	0	no	
Miller, K. D. (2008). "Simon and Polanyi on Rationality and Knowledge." Organization Studies 29(7): 933-955.	0	no	
Chia, R. and R. Holt (2008). "On Managerial Knowledge." Management Learning 39(2): 141-158.	0	no	
Charreire Petit, S. and I. Huault (2008). "From Practice-based Knowledge to the Practice of Research: Revisiting Constructivist Research Works on Knowledge." Management Learning 39(1): 73-91.	0	no	
Bennet, Alex, D. B. (2008). "The fallacy of knowledge reuse: building sustainable knowledge[1]" Journal of Knowledge Management 12(5): 21-33.	0	no	

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - COMMUNITIES OF PRACTICE	Citations	Empirical	Level/Focus of Analysis	Methods
Orlikowski, W. J. (2002). "Knowing in Practice: Enacting a Collective Capability in Distributed Organizing." ORGANIZATION SCIENCE 13(3): 249-273.	248	yes	Organisation called Kappa	interview and observation
Brown, J. S. and P. Duguid (2001). "Knowledge and Organization: A Social-Practice Perspective." ORGANIZATION SCIENCE 12(2): 198-213.	225	no		
Bechky, B. A. (2003). "Sharing Meaning Across Occupational Communities: The Transformation of Understanding on a Production Floor." ORGANIZATION SCIENCE 14(3): 312-330.	77	yes	Silicon Valley company	ethnography: observation and interviews
Ardichvili Alexander, V. P., Tim Wentling (2003). "Motivation and barriers to participation in virtual knowledge-sharing communities of practice." Journal of Knowledge Management 7(1): 64-77.	46	yes	3 CoP in multinational company	interviews across 3 CoP
Cabrera, A. and E. F. Cabrera (2002). "Knowledge-Sharing Dilemmas." Organization Studies 23(5): 687-710.	38	no		
Gherardi, S. (2001). "From organizational learning to practice-based knowing." Human Relations 54(1): 131-139.	17	no		
Tsoukas, H. (2002). "Introduction: Knowledge-Based Perspectives on Organizations: Situated Knowledge, Novelty, and Communities of Practice." Management Learning 33(4): 419-426.	8	no		
Lindkvist Lars,(2005). "Knowledge Communities and Knowledge Collectivities: A Typology of Knowledge Work in Groups*." Journal of Management Studies 42(6): 1189-1210.	6	no		
Ensor, J., A. Cottam, et al. (2001). "Fostering knowledge management through the creative work environment: a portable model from the advertising industry." Journal of Information Science 27(3): 147-155.	5	yes	6 advertising agencies	interviews
Becerra, Manuel, (2008). "Trustworthiness, Risk, and the Transfer of Tacit and Explicit Knowledge Between Alliance Partners." Journal of Management Studies 45(4): 691-713.	4	yes	CEO in large sample of companies	questionnaire
Klein, J. H., N. A. D. Connell, et al. (2005). "Knowledge characteristics of communities of practice." Knowl Manage Res Prac 3(2): 106-114.	1			
Vaast, E. (2007). "What Goes Online Comes Offline: Knowledge Management System Use in a Soft Bureaucracy." Organization Studies 28(3): 283-306.	1	yes	public administration	case study: interviews
Swan, J., M. Bresnen, et al. (2007). "The object of knowledge: The role of objects in biomedical innovation." Human Relations 60(12): 1809-1837.	1	yes	10 biomedical innovations	interviews
Khe Foon Hew, N. H. (2007). "Knowledge sharing in online environments: A qualitative case study." Journal of the American Society for Information Science and Technology 58(14): 2310-2324.	0	yes	professional practices—advanced nursing practice, Web development, and literacy education.	observation and interview

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - BARRIERS TO TRANSFER & ORGANISATIONAL DEVELOPMENT	Citations	Empirical	Level/Focus of Analysis	Methods
McDermott, Richard C. O. D. (2001). "Overcoming cultural barriers to sharing knowledge" Journal of Knowledge Management 5(1): 76-85.	47	yes	"company" via one person's account	survey and one 6 hour interview in 5 named companies
Empson, L. (2001). "Fear of exploitation and fear of contamination: Impediments to knowledge transfer in mergers between professional service firms." Human Relations 54(7): 839-862.	31	yes	individuals	multi-site, multi-phase, multi-source case-based: 6 companies, longitudinal and retrospective,
Doolin Bill, (2004). "Power and resistance in the implementation of a medical management information system." Information Systems Journal 14(4): 343-362.	15			
Mom, Tom J. M. F. A. J. V. D. B. H. W. V. (2007). "Investigating Managers' Exploration and Exploitation Activities: The Influence of Top-Down, Bottom-Up, and Horizontal Knowledge Inflows*." Journal of Management Studies 44(6): 910-931.	5	yes	managers in electronics company	questionnaire to 225 managers
Morris, T. and Z. Lancaster (2006). "Translating Management Ideas." Organization Studies 27(2): 207-233.	4	yes	individuals at industry, firm and project level - lean management in construction	interviews and survey
McNulty, T. (2002). "Reengineering as Knowledge Management: A Case of Change in UK Healthcare." Management Learning 33(4): 439-458.	3	yes	UK hospital	interviews
Engwall, L. and M. Kipping (2004). "Introduction: The Dissemination of Management Knowledge." Management Learning 35(3): 243-253.	3			
Guzman, Gustavo A.C. J. W. (2005). "The "soft" dimension of organizational knowledge transfer" Journal of Knowledge Management 9(2): 59-74.	3			
Hall, H. and M. Goody (2007). "KM, culture and compromise: interventions to promote knowledge sharing supported by technology in corporate environments." Journal of Information Science 33(2): 181-188.	3			
Leiter, M. P., A. L. Day, et al. (2007). "Personal and organizational knowledge transfer: Implications for worklife engagement." Human Relations 60(2): 259-283.	1			
Lin C, T. B., Chang S (2008). "An exploratory model of knowledge flow barriers within healthcare organizations " Information and Management 45(5): 331-339.	0			

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - BARRIERS TO TRANSFER & ORGANISATIONAL DEVELOPMENT	Citations	Empirical	Level/Focus of Analysis	Methods
McDermott, Richard C. O. D. (2001). "Overcoming cultural barriers to sharing knowledge" <i>Journal of Knowledge Management</i> 5(1): 76-85.	47	yes	"company" via one person's account	survey and one 6 hour interview in 5 named companies
Empson, L. (2001). "Fear of exploitation and fear of contamination: Impediments to knowledge transfer in mergers between professional service firms." <i>Human Relations</i> 54(7): 839-862.	31	yes	individuals	multi-site, multi-phase, multi-source case-based: 6 companies, longitudinal and retrospective,
Doolin Bill, (2004). "Power and resistance in the implementation of a medical management information system." <i>Information Systems Journal</i> 14(4): 343-362.	15			
Mom, Tom J. M. F. A. J. V. D. B. H. W. V. (2007). "Investigating Managers' Exploration and Exploitation Activities: The Influence of Top-Down, Bottom-Up, and Horizontal Knowledge Inflows*." <i>Journal of Management Studies</i> 44(6): 910-931.	5	yes	managers in electronics company	questionnaire to 225 managers
Morris, T. and Z. Lancaster (2006). "Translating Management Ideas." <i>Organization Studies</i> 27(2): 207-233.	4	yes	individuals at industry, firm and project level - lean management in construction	interviews and survey
McNulty, T. (2002). "Reengineering as Knowledge Management: A Case of Change in UK Healthcare." <i>Management Learning</i> 33(4): 439-458.	3	yes	UK hospital	interviews
Engwall, L. and M. Kipping (2004). "Introduction: The Dissemination of Management Knowledge." <i>Management Learning</i> 35(3): 243-253.	3			
Guzman, Gustavo A.C. J. W. (2005). "The "soft" dimension of organizational knowledge transfer" <i>Journal of Knowledge Management</i> 9(2): 59-74.	3			
Hall, H. and M. Goody (2007). "KM, culture and compromise: interventions to promote knowledge sharing supported by technology in corporate environments." <i>Journal of Information Science</i> 33(2): 181-188.	3			
Leiter, M. P., A. L. Day, et al. (2007). "Personal and organizational knowledge transfer: Implications for worklife engagement." <i>Human Relations</i> 60(2): 259-283.	1			
Lin C, T. B., Chang S (2008). "An exploratory model of knowledge flow barriers within healthcare organizations " <i>Information and Management</i> 45(5): 331-339.	0			

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - KNOWLEDGE TRANSFER	Citations	Empirical	Level/Focus of Analysis	Methods
Newell, S. J. A. S. R. D. G. (2000). "A knowledge-focused perspective on the diffusion and adoption of complex information technologies: the BPR example." <i>Information Systems Journal</i> 10(3): 239-259.	34	no		
Rodan Simon, C. G. (2004). "More than network structure: how knowledge heterogeneity influences managerial performance and innovativeness." <i>Strategic Management Journal</i> 25(6): 541-562.	30	yes	employees in telecommunications company	questionnaire
Haas, Martine R. M. T. H. (2005). "When using knowledge can hurt performance: the value of organizational capabilities in a management consulting company." <i>Strategic Management Journal</i> 26(1): 1-24.	24	yes	sales teams	survey
Dyer, Jeffrey H. N. W. H. (2006). "Relation-specific capabilities and barriers to knowledge transfers: creating advantage through network relationships." <i>Strategic Management Journal</i> 27(8): 701-719.	18	yes	Toyota suppliers	survey
Muthusamy, S. K. and M. A. White (2005). "Learning and Knowledge Transfer in Strategic Alliances: A Social Exchange View." <i>Organization Studies</i> 26(3): 415-441.	16	yes	strategic alliances in industry groups	archive and survey data
Syed Omar Sharifuddin Syed-Ikhsan, F. R. (2004). "Knowledge management in a public organization: a study on the relationship between organizational elements and the performance of knowledge transfer." <i>Journal of Knowledge Management</i> 8(2): 95-111.	14	yes		questionnaire
Yates-Mercer, P. and D. Bawden (2002). "Managing the paradox: the valuation of knowledge and knowledge management." <i>Journal of Information Science</i> 28(1): 19-29.	10	no		
Bogner, William C. P. B. (2007). "Knowledge Management as the Basis of Sustained High Performance." <i>Journal of Management Studies</i> 44(1): 165-188.	4	yes	patent records 42 firms	regression
Goh, A. L. S. (2005). "Harnessing knowledge for innovation: an integrated management framework" <i>Journal of Knowledge Management</i> 9(4): 6-18.	3	no		
Christensen, P. H. (2007). "Knowledge sharing: moving away from the obsession with best practices" <i>Journal of Knowledge Management</i> 11(1): 36-47.	3	yes	12 employees in production co.	interview and questionnaire
Brydon M, V. A. (2006). "Understanding the failure of internal knowledge markets: A framework for diagnosis and improvement" <i>Information and Management</i> 43(8): 964-974.	1			
Lin, H.-F. (2007). "A stage model of knowledge management: an empirical investigation of process and effectiveness." <i>Journal of Information Science</i> 33(6): 643-659.	1	yes	141 execs in Taiwan co.	
Lervik, J. E. and R. Lunnan (2004). "Contrasting Perspectives on the Diffusion of Management Knowledge: Performance Management in a Norwegian Multinational." <i>Management Learning</i> 35(3): 287-302.	0	no		
Chang Lee K, L. S., Kang W (2005). "KMPI: measuring knowledge management performance " <i>Information and Management</i> 43(2): 469-482.	0			
Chen, M.-Y. and A.-P. Chen (2006). "Knowledge management performance evaluation: a decade review from 1995 to 2004." <i>Journal of Information Science</i> 32(1): 17-38.	0	no		
Faems, D., M. Janssens, et al. (2007). "The Initiation and Evolution of Interfirm Knowledge Transfer in R&D Relationships." <i>Organization Studies</i> 28(11): 1699-1728.	0	yes		
Ashley Braganza, R. H. S. T. (2007). "Organizational knowledge transfer through creation, mobilization and diffusion: a case analysis of <i>InTouch</i> within Schlumberger." <i>Information Systems Journal</i> 9999(9999).	0	yes		
Parent, Robert, M. R., Denis St-Jacques (2007). "A systems-based dynamic knowledge transfer capacity model." <i>Journal of Knowledge Management</i> 11(6): 81-93.	0	no		
Gravier, Michael J. David Strutton (2008). "Investigating the role of knowledge in alliance performance." <i>Journal of Knowledge Management</i> 12(4): 117-130.	0	no - meta analysis		
Rhodes, Jo, R. H., Peter Lok, Bella Ya-Hui Lien, Chi-Min Wu (2008). "Factors influencing organizational knowledge transfer: implication for corporate performance" <i>Journal of Knowledge Management</i> 12(3): 84-100.	0	yes		questionnaire

Appendix 1 – Phase 1 Management Literature Search Results Coded by Domain

DOMAIN - ANTHROPOLOGY, CULTURE, CONVERSATION MANAGEMENT	Citati ons	Empirical	Level/Focus of Analysis	Methods
Carlile, P. R. (2002). "A Pragmatic View of Knowledge and Boundaries: Boundary Objects in New Product Development." ORGANIZATION SCIENCE 13(4): 442-455.	149	yes	knowledge in manufacturing	ethnographic
Bart van den Hooff, J. A. d. R. (2004). "Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing " Journal of Knowledge Management 8(6): 117-130.	3	yes	444 employees in 6 case study organisations	questionnaire
Adel Ismail Al-Alawi, N. Y. A.-M., Yasmeen Fraidoon Mohammed (2007). "Organizational culture and knowledge sharing: critical success factors." Journal of Knowledge Management 11(2): 22-42.	1	yes	public and private sector organisations in Bahrain	questionnaire and interview
Mengis, J. and M. J. Eppler (2008). "Understanding and Managing Conversations from a Knowledge Perspective: An Analysis of the Roles and Rules of Face-to-face Conversations in Organizations." Organization Studies 29(10): 1287-1313.	0	no		

Appendix 2 - GLOSSARY OF ACRONYMS

A&E	Accident & Emergency
AHSC	Academic Health Science Centre
ANT	Actor Network Theory
BRfBH	Better Research for Better Health
BRC	Biomedical Research Centre
BRC	Biomedical Research Centre
CAD	Computer Aided Design
CfH	CfH: Connecting for Health.
CERAG	Clinical Effectiveness Research Advisory Group
CLAHRC	Collaboration for Leadership in Applied Health Research Centre
CoP	Community of Practice
DC	Dynamic Capability
DH	Department of Health
DIKW	Data, Information, Knowledge, Wisdom
EBHC	Evidence Based Health Care
EBMgt	Evidence Based Management
EBP	Evidence Based Policy
EKR	Electronic Knowledge Repository
GDP	Gross Domestic Product
HTA	Health Technology Assessment
HTA	Health Technology Assessment
HR	Human Resources
ICT	Information and Communication Technology
IS/IT	Information Systems/Information Technology
ISDM	Information System Development Methodology
KI	Knowledge Innovation
KIF	Knowledge Intensive Firm
KM	Knowledge Management and Knowledge Mobilisation
KMS	Knowledge Management System
KT	Knowledge Transfer
KTE	Knowledge transfer and exchange
MCO	Managed Care Organisation
MRC	Medical Research Council
MeSH	Medical Subject Headings
MHRA	Medicines and Healthcare products Regulatory Agency
NCRN	National Cancer Research Network
NHS	National Health Service
NHS R&D	National Health Service Research and Development.
NICE	National Institute for Health and Clinical Excellence
NIHR	National Institute for Health Research
NII	National Institute for Innovation and Improvement
NPfIT	National Programme for Information Technology
NEAT	New and Emerging Applications of Technology
OD	Organisational Development
OSCHR	Office for Strategic Coordination of Health Research
OECD	Organisation for Economic Co-operation and Development
PI	Principal Investigator
PSF	Professional Service Firm
R&D	Research & Development
RCT	Randomised Control Trial
RU	Research Utilisation
RBV	Resource Based View
SDO	Service Delivery and Organisation
SOAP	Situation-oriented, physician/patient
TRA	Theory of Reasoned Action
UKCRN	UK Clinical Research Network